

# The Sight-Saving Review

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## Table of Contents

	PAGE
THE PARTIALLY SEEING CHILD IN THE REGULAR CLASSROOM, Dorothea di Pretoro.....	63
PRESENT STATUS OF ACTH AND CORTISONE IN TREATMENT OF EYE DISEASES, John M. McLean, M.D.....	67
PRESENT STATUS OF RETROLENTAL FIBROPLASIA, Algernon B. Reese, M.D..	68
RELATIONSHIP OF FUNDAMENTAL RESEARCH IN BIOCHEMISTRY TO CLINICAL OPHTHALMOLOGY, Irving H. Leopold, M.D.....	70
RELATIONSHIP OF ARMED FORCES RESEARCH TO CLINICAL OPHTHALMOLOGY, Henry A. Imus, Ph.D.....	73
THE BLINDNESS RESEARCH PROGRAM OF THE U. S. PUBLIC HEALTH SERVICE, W. H. Sebrell, Jr., M.D.....	77
RESEARCH IN GLAUCOMA, Eugene M. Blake, M.D.....	81
THE PLACE OF MANAGEMENT IN EYE CONSERVATION, Reginald E. Gillmor..	85
PRACTICAL ASPECTS OF EYE PROTECTION, Russell N. Crosby.....	88
THE GOVERNMENT AGENCY IN PREVENTION OF BLINDNESS—A PANEL DISCUSSION.....	91
A PUBLIC HEALTH APPROACH TO THE PREVENTION OF BLINDNESS, Leonard A. Scheele, M.D.....	98
PREVENTION OF BLINDNESS THROUGH VOLUNTARY EFFORT—A PANEL DISCUSSION.....	103
CIVIC GROUP ACTIVITIES FOR PREVENTION OF BLINDNESS—A PANEL DISCUSSION.....	110
NOTE AND COMMENT.....	114
CURRENT ARTICLES OF INTEREST.....	118
BOOK REVIEWS.....	122

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**LEWIS W. DOUGLAS**

*Honorary President of the National Society  
for the Prevention of Blindness*

**L**EWIS W. DOUGLAS, former Ambassador to Great Britain, who has been elected Honorary President of the Society, follows in the footsteps of several distinguished predecessors, among them William Howard Taft and Elihu Root. Mr. Douglas is chairman of the board of the Mutual Life Insurance Company of New York, and of Memorial Hospital. He is also chairman of the National Policy Board of the American Assembly at Columbia University; a trustee of the Institute for Advanced Studies, Amherst College; and of the American Museum of Natural History. Mr. Douglas now makes his home in Sonoita, Arizona, and is still being treated for an eye injury suffered in England.

The service of the distinguished former ambassador will be an inspiration to the physicians and laymen who are devoting themselves to the National Society's campaign to conserve vision.

## The Partially Seeing Child in the Regular Classroom\*

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EMPHASIZES the psychological as well as the educational value in considering the partially seeing child as a member of a regular classroom.

IN discussing the rôle of the partially seeing child in the regular grade, consideration must be given to a number of preliminary factors. It is most important that a study be made of the child, his handicap, abilities, interests, limitations and home environment. The recommendations of the ophthalmologist and the relationships of the school personnel also require consideration before a visually handicapped child is placed in the regular grade.

Some people question the advisability of permitting a partially seeing child to spend part of the school day in a grade room when crippled children and mentally retarded children must remain in their special rooms all day. It is quite obvious that crippled children who use specially constructed furniture cannot function with any degree of comfort in a

regular classroom. Mentally retarded children are unable to compete with pupils of their own age and would meet with repeated failures in a grade room, thus adding to their difficulties. The partially seeing child, however, can take part in the regular grade program for part of the school day without discomfort and with considerable benefit to his emotional and social development. As a full-time student in a regular grade, he would soon become a problem.

The policy of the coordinated program for visually handicapped children was initiated in the sight-saving class in Cleveland in 1913 by Dr. Robert Irwin. The National Society for the Prevention of Blindness studied this plan and wholeheartedly endorsed it. With Mrs. Winifred Hathaway as a pioneer missionary for the National Society for the Prevention of Blindness, the policy has been quite universally adopted, and great credit is due them for their

\* Presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951.

untiring efforts in the interests of children with poor vision.

Furthermore, the foresight shown by the pioneers in this field has taken root in the general program of education. The trend today is against segregation of children and decidedly in favor of individual instruction according to the abilities, maturation, achievement levels, and interests of the individual.

There are certain benefits provided for the visually handicapped child by his attendance in a regular classroom. He receives an opportunity to obtain various viewpoints, wholesome competition where he can attain some degree of success, social development at his own age level, independence in the absence of his special teacher and a feeling of belonging to a group. These benefits all aid in meeting the basic needs of the partially seeing child, and tend to emphasize his potentialities and minimize the limitations of his handicap.

### **The Sight Conservation Teacher**

In effecting the grade placement of a visually handicapped child, the teacher of the special class is the key figure. She must have a knowledge of eye diseases and their implications in order to provide a suitable program for eye hygiene for the children and to interpret to the grade teacher the recommendations of the ophthalmologist. She should investigate the home conditions, study the child's school and health records, discover his interests and administer diagnostic tests to determine the level of achievement.

She should be familiar with the special services which might be needed, such as psychological, psychiatric,

medical, educational, recreational and vocational. Specialists in these various fields can be most helpful to the sight conservation teacher in planning a school program for the visually handicapped child.

The duties of the sight conservation teacher include care of the eyes, teaching all subjects which require intensive eye work, typewriting on the Bulletin (large print) typewriter, selecting and enlarging material which is not available in large print books, teaching suitable arts and crafts, obtaining companions to serve as readers, explaining eye hygiene program to the grade teacher and keeping records of the child's school progress and medical reports.

### **Principal**

The principal of the school plays a very important part in planning the grade placement for a partially seeing child. He should have a sympathetic understanding of the work, and a knowledge of the aims to lay the groundwork for the success of a co-ordinated program. He should acquaint the grade teachers with the plan before assigning the partially seeing children to their classes. As an illustration of a carefully planned Junior High School program which has proved successful, excerpts from a school circular, issued by the principal, read as follows:

"The program for the new sight conservation class in our school calls for your cooperation.

"The sight conservation pupils will be placed in regular classes to travel with the classes and take to all the work with the exceptions noted.



"1. Need I suggest that your first duty is to welcome these pupils and to give them a copy of the class program promptly?

"2. The pupil is to be regarded as a regular member of the class with which he is traveling. Miss J will assume all clerical responsibility concerning the pupils including attendance.

"3. The sight conservation pupils are to return to Room 409 when the regular class attends the following periods. Note well, no pupils of the sight conservation class may attend these periods: sewing, millinery, physical training, drawing.

"4. The pupil is to be seated in the front, center of the room. Please check with child re adjustment in seat and permit change of seat, if necessary.

"5. The pupil is to be permitted to leave the room and return to Room 409 whenever the class is assigned a study lesson requiring reading from a text.

"6. Please send two copies of the texts you use to Miss J, Room 409. She will gradually type in large print copies of the book as the lessons progress. If you give her information re lessons in advance she will try to have them ready for the lesson.

"7. The same procedure of #6 holds true for all tests.

"8. Miss J will help the pupils as far as possible with the homework assignments. The pupils are not to be required to do additional work of any nature at home.

"9. Miss J will at all times be ready to cooperate and follow up any

suggestions you may make for the good of the pupils.

"We realize that this arrangement gives you additional work and increases your registers but we know you will be helpful to the handicapped pupils who are unfortunate enough to need special help."

This circular letter defined clearly the responsibilities of the grade teacher, the pupils and the sight conservation teacher and was instrumental in setting up an excellent sight conservation program in the school.

### **Regular Grade Teacher**

The teacher of the grade can be most helpful to the visually handicapped children and the special teacher by carrying out the instructions provided by the principal. She should try to include the handicapped child in all activities and treat him as a member of the class. She should assign the child to a seat near the blackboard and in a well-lighted part of the room to prevent undue strain on the eyes. She should confer with the special teacher if any problems related to the handicapped child arise. The two teachers, working together, can help the partially seeing child obtain the same educational opportunities which are offered to normally sighted pupils and at the same time provide means of conserving vision.

### **The Partially Seeing Child in the Regular Grade**

The special teacher instructs the child to follow his grade program. He enters the grade room quietly and on time and equipped for the lesson and leaves when the lesson is finished or if the lesson requires close eye work.

He participates in oral and dictated work. He comes with his assignments which were prepared in the special classroom. He takes materials from his special room to supplement the work of the grade, such as outline or clay maps, a large-print book related to the lesson or suitable pictures or drawings. Being a contributor to the regular grade develops the feeling of belonging to the group and tends to make the group accept the child.

Children in the lower grades spend about one third of the day in the regular classroom while the children in the upper grades spend more than half of their time with normally sighted classmates. Curriculum changes in recent years make it difficult to prescribe exactly how much time the handicapped child should spend in the regular grade but it is important that work involving use of the eyes should be done in the special classroom. The vast amount of research done by children in the regular grades today indicates that the partially seeing child must obtain his assignment in the special classroom where he has the materials and equipment best suited to his needs.

The effectiveness of placing the partially seeing child in the regular

grade has been noted in numerous cases. The wholesome development of the child has been achieved and the eyes have been given all possible protection.

The success of the sight conservation program is acclaimed in the following note recently received from a principal:

"Bernard used to be a truant and a problem case. He is now a good student. I attribute this metamorphosis largely to the program in our sight conservation class."

### Conclusion

Grade placement for visually handicapped children is important since it offers some compensation for the frustrations, rejections, lack of security and other psychological problems due to the handicap. To achieve the maximum benefit from the sight conservation program it is necessary for the sight conservation teacher to coordinate the services of experts in the medical, educational and vocational fields, who can work as a team, in providing guidance for the education and emotional and social development of the partially seeing child.

## Present Status of ACTH and Cortisone in Treatment of Eye Diseases\*

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ALTHOUGH too early for true evaluation, ACTH and cortisone are useful in treating certain inflammations of the eye.

IN the year and a half since ACTH and cortisone were first used in the treatment of eye diseases a great deal has been learned about the usefulness of these drugs in ophthalmology; however, we are still far from knowing the whole story.

ACTH and cortisone have essentially the same effect on the eye. Both drugs are useful in treating certain inflammatory conditions of the eye, such as: some forms of keratitis (inflammation of the cornea); chorioiditis, iritis, uveitis (inflammation inside the eye), and many allergic reactions. Both drugs are effective in the treatment of sympathetic ophthalmia (loss of vision in one eye which sometimes occurs following serious injury to the other eye), and in fact they offer the first successful method of directly treating this particular eye condition.

\* Summary of report delivered at the Annual Conference of the National Society for the Prevention of Blindness, March 28, 1951.

ACTH and cortisone give promise of widening the possibilities for successful corneal grafts. It appears that by the use of these drugs some eyes are "graftable" that could not formerly take a graft. However, this use of the drugs is still in the early experimental stages.

On the other hand, ACTH and cortisone have been found to have no value in treating cataracts, primary glaucoma, and degenerative diseases of the eye.

Both ACTH and cortisone help in the treatment of certain eye diseases by suppressing inflammation, by holding it in check until the eye can get well, and thus keeping the inflammation from damaging eye tissue while the healing process is going on. It must be emphasized, however, that ACTH and cortisone cannot do the job of the antibiotics in attacking and routing infection—they can only suppress inflammatory conditions. Both drugs are very potent agents,

especially when used systemically, and treatment cannot be undertaken lightly or without the best of medical supervision.

Cortisone has the advantage in that it can be used systemically or locally, whereas ACTH can be used only systemically. Many persons cannot take either drug systemically,

but can take cortisone locally in the eye. There is a definite limit to how much of either drug a patient is able to take systemically. The tolerance level is much higher when cortisone is administered locally, but we do not yet know how long an inflammation can be held in check by the use of cortisone locally.

## Present Status of Retrolental Fibroplasia\*

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USE of ACTH in treatment of retrolental fibroplasia seems to show promise if the disease is picked up at the earliest possible moment.

**R**ETROLENTAL fibroplasia is a blinding disease affecting both eyes of 20 to 25 per cent of premature infants with a birth weight of 1,000 to 1,500 grams (2 to 3 pounds). The lower the birth weight the higher the incidence. The active phase of the disease is over by three months of age and is usually followed by irrevocable blindness.

Retrolental fibroplasia is either a new disease or a sharp increase in an old disease. In past years the number of premature infants was so few that the condition, if it existed, was not picked up. But now with a substantially greater number of pre-

matures being saved the disease is becoming a serious problem. As greater numbers of prematures are saved from death, the cases of blindness due to retrolental fibroplasia will increase—unless a successful method of treatment can be found.

In seeking the answer, we have tried treatment in the later stages of the disease, with no success. Surgery has been tried; again with no success. It has been determined that if these tiny prematures are to be saved from blindness, the presence of the disease must be picked up at the very earliest possible moment, and proper treatment given.

As to what this proper method of treatment is, no one yet has the final answer. However, we are very

\* Summary of report delivered at the Annual Conference of the National Society for the Prevention of Blindness, March 28, 1951.

encouraged so far by results obtained with the use of ACTH.

Whether ACTH or some other method of treatment is the final answer, I am confident that medical science will ultimately find a solution to this problem. And when that day comes it will mean new work for prevention of blindness agencies in applying this sight-saving knowledge.

In our experience we have found that low-weight, premature infants must be examined each week until they are three months old, to be sure that retrolental fibroplasia is picked up at the very start of its development. So far there appears to be no successful way of dealing with the disease once it is fully established.

ENVIRONMENT AND DISEASE.—Recognized agents of disease include substances of physical, chemical, and biologic nature. Disturbance is caused sometimes by their presence in excess amount, as with lead or the typhoid bacillus, and sometimes by a deficiency, as with niacin in pellagra or cortin in endocrine disorders. As a result, disease is to be recognized either as a positive or a negative phenomenon. . . .

The practical analysis of environment in causation of disease is furthered through dividing the many features into three broad categories, which are the physical environment, the biologic environment and the social environment, the latter having to do with those constituents originating in the association of man with his fellow man.—John E. Gordon, M.D., "The Newer Epidemiology," *Tomorrow's Horizon in Public Health*, 1950.

# Relationship of Fundamental Research in Biochemistry to Clinical Ophthalmology\*

Irving H. Leopold, M.D., *Director of Research*

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CITES early beginnings of interest in antibiotics and other substances and their relationship to eye problems.

SCIENCE is frequently a graveyard of ideas. Every year new ideas are studied, investigated, and tested. Very frequently these ideas progress so far and then are forgotten. Sometimes they are dug up years later, revitalized and flourish, reaching greater heights than they have ever attained before. There are many examples of this in the scientific literature and experience. In 1933 Domagk, employing a dye (one of the sulfonamides) which had been prepared by Gelmo in 1908, twenty-five years previously, found that he could overcome many types of bacterial infections in experimental animals.

All of us are familiar with the great work stimulated by the observations of Alexander Fleming. In 1929 he reported on the antibacterial effect of products of the penicillin mold. Very little was done with this observation until the Floreys rekindled

interest in penicillin by their studies in 1939 and 1940, over ten years after the original observation by Fleming. Actually, it should be noted that in 1925 Gratia and Sara Dath, working in Bordet's laboratory, noted that the streptothrix produced a substance capable of destroying staphylococci; and also, that one of the molds belonging to the penicillium family produced a material with the same effect. This idea of bacteria being able to produce material that could destroy other bacteria has been known for many years. In 1899 Emmerich and Low found that a product of the bacillus pyocyaneus could destroy the organism responsible for cholera and the organism responsible for anthrax. Schoenthal, one of Florey's assistants, a few years ago, almost forty years after the original discovery by Emmerich and Low, found that this product of the pyocyaneus consisted of at least three different substances.

At the turn of the century, Rosenthal, at Pasteur Institute, discovered that

\* Extract of paper presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951.

the sporulating anerobic bacteria from the group tyrothrix could destroy the germs of cholera and of typhoid fever.

Thirty years later DuBos through an exhausting and brilliantly conceived series of experiments found an organism in the soil that had the ability of inhibiting the growth of other bacteria. He isolated this soil bacillus and then by extracting a water-insoluble, alcohol-soluble material from these organisms, was able to obtain a substance with high bactericidal and bacteriostatic properties against gram-positive organisms which he called gramicidin. This organism was the bacillus brevis, belonging to the genus tyrothrix, and this is the group that Rosenthal had studied at the turn of the century.

One wonders why these discoveries are allowed to remain dormant for so many years before they are revived and reinvestigated. Frequently these ideas are just forgotten. They are buried in obscure journals and not seen by the people who might be interested in carrying them further. Sometimes there are insufficient funds to carry on research, and a scientist is forced to work on some problem for which funds are available; or he has to direct his energies along other lines in which he can make a better living for himself and his family. Sometimes the problem is similar to the one encountered by Metchnikoff—a matter of production of sufficient quantity of material to carry out tests. Actually this was the problem with penicillin, and the reason it was not utilized for ten long years. It was only through the wisdom and judgment of such men as A. Newton Richards, Keefer, Cogshill, Thom and others who foresaw the possibilities of penicillin

through the revival work of the Floreys, that large sums of money were allocated along the lines that led to greater production of the penicillin molds and of the penicillin itself.

Sometimes research work which starts out along one line and with one purpose in mind leads to results that are useful along a completely different line.

BAL, a dithiol, is a fascinating compound and it was developed under the stimulus of war necessity. However, long before the discovery of the dithiols as protective agents against a toxic action of various metal salts, Voegtlin and his co-workers in 1932 demonstrated that various monothiods such as reduced glutathiones and thioglycolic acid counteract the toxic action of arsenoxide on trypanosomes and analogous species. The mechanism of this protection is believed to be one of competition. The "SH" groups of the protective agent compete for the arsenic that would otherwise combine with similar groups in the body proteins. However, when the monothiods were tested against lewisite they were found to be quite ineffective. It was this fact and the theoretical consideration that the dithiols might form relatively stable ring compounds with trivalent arsenicals that led to the preparation and testing of the dithiols by the British investigators.

One of the most fascinating facts about this work is that since the war it has developed a very practical everyday value. BAL can be used and is being used in everyday practice for the treatment of poisonings due to metals. Many individuals who have been treated with arsenical compounds and develop a reaction



from the arsenic can be successfully treated by the use of BAL.

Patients who have received gold therapy for arthritis and the like sometimes develop toxic symptoms from the gold and it has been found that BAL will protect these individuals from the hazards of gold therapy.

Along this same line, it is important to note that during the war a new gas was investigated; namely, the fluorophosphates. Interest in the fluorophosphates was stimulated in World War II by information obtained from war prisoners indicating that Germany had prepared quantities of an alkyl derivative of fluorophosphoric acid for possible use as a war gas. It was probably the nerve poison about which rumors were current at the time.

A series of alkyl derivatives of the fluorophosphates was prepared and the toxicity for various species of animals studied. A striking feature of their action was an intense, long lasting constriction of the pupil, and this suggested an action similar to that of physostigmine on cholinesterase. Not only was the cholinesterase more sensitive to di-isopropyl fluorophosphate than to physostigmine but the action was much more prolonged. Inhibition of cholinesterase by DFP, the abbreviation of di-isopropyl fluorophosphate, is almost immediate and is not reversible by any known means.

Because of this long-lasting and potent constriction of the pupil, it was felt that this drug should be investigated for its ability to control the intraocular pressure in patients with glaucoma. As you know, eserine which has similar action to DFP, but is much weaker and shorter acting

in its effect, is a common drug employed in the treatment of glaucoma. Therefore, studies were undertaken in this country to determine whether DFP would be of benefit in the therapy of glaucoma. Following the initial studies, it has been shown that this agent will lower intraocular pressure in normal eyes; it will lower intraocular pressure in eyes with glaucoma; it will lower intraocular pressure in some eyes with glaucoma which have not been successfully treated by other means. There is no doubt that this has proved to be a valuable addition to our therapy for the medical treatment of glaucoma. Thus we see once again that research work with a chemical warfare agent has given rise to a practical agent in our everyday treatment of ocular disease.

There are many other fascinating stories of research applying to ocular conditions which can be told. Stories of fundamental research in biochemistry and related subjects have led not only to greater knowledge of ocular conditions and ocular functions but also to therapeutic measures which are useful in everyday life. It takes no stretch of the imagination to see how important it is that this type of research work be continued. There are vast fields to be explored and the only thing which limits the exploration is the number of hands and the number of minds and the funds which are available for the task before us. Let us not allow data already available, that might be useful in preventing blindness, ameliorating symptoms and shortening convalescence today, to lie dormant because of insufficient funds, manpower and know-how.



# Relationship of Armed Forces Research to Clinical Ophthalmology\*

Henry A. Imus, Ph.D., Director

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POINTS out the rôle of Army, Navy and Air Force research in problems arising in lay and industrial life.

THE mission of the medical departments of the Departments of Defense, in addition to the prompt and adequate care of the sick and wounded, is to maintain the health and well-being of every member of the service. This program of preventive medicine begins with the first medical examination upon admission and continues throughout the individual's service. Upon discharge for medical reasons, the Veterans Administration continues the medical care and provides rehabilitation services.

During World War I, visual standards for the various services were established by necessarily arbitrary decisions by ophthalmologists who were called in as consultants by the Surgeons General of the Army and Navy. Much of the emphasis upon high visual standards was brought

about by the advent of aviation. Between wars there was little need to review the established standards because there was a plentiful supply of men who could meet the requirements and who volunteered for military service.

During the year of hurried preparation prior to Pearl Harbor, some thought was given and action taken relative to visual requirements for special jobs. For example, a large research project was undertaken at the Coast Artillery School at Fort Monroe to determine selection standards for range finder operators. At New London, Connecticut, the developing Naval Medical Research Laboratory was studying visual requirements for submarine personnel. At the Schools of Aviation Medicine, Pensacola (Navy), and Randolph Field (Army), studies of space perception and motor anomalies were undertaken. All of these activities

\* Presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951.

were expedited greatly with the mobilization for World War II.

The Armed Forces-National Research Council Vision Committee, and the NRC Committee on Ophthalmology rendered valuable consultative services in reviewing visual standards, vision testing techniques, ophthalmological supply tables and field medical kits.

### **Research Related to Specific Problems**

In general, the ophthalmological research programs of the military departments are relevant to operational problems or to industrial problems. For example, operational problems include the visual requirements for specific military operations (range finders in tanks); visual standards for aviation (pilot, bombardier); night visual performance of night lookouts, night-fighter pilots, commando-type operations; use of contact lenses by pilots, or by ground troops; visual factors in the use of binoculars, telescopes and periscopes. Industrial problems include the protection of the eyes from flying particles, radiation and flash burns; chemical burns; visual factors in job performance; color and intensity of illumination and surroundings, etc.

In addition, both fundamental and clinical research in ophthalmology are conducted in military facilities, such as Army Hospitals (Walter Reed), Naval Hospitals, National Naval Medical Center, Naval School of Aviation Medicine (Pensacola, Fla.), Naval Submarine Base (New London, Conn.), and the Air Force School of Aviation Medicine (Randolph Air Base, Texas).

### **Naval Eye Research**

In the Naval facilities, some of the research of interest to clinical ophthalmologists includes the following:

1. The Atlas of Pathology (in color) produced by the Naval Medical School (Bethesda) contains 16 pages of pictures and comments on the pathology of the eye, including microscopic sections of trachoma, glaucoma and tumors.
2. At the US Naval Hospital (Philadelphia) eye prostheses are developed for hospitalized Naval personnel.
3. At the US Naval Medical Research Laboratory (New London, Conn.) a number of studies are under way. For example, tests of color perception are being developed and evaluated; vision screening devices (Ortho-Rater, Sight-Screener and Telebinocular) have been evaluated against standard ophthalmologic examinations; dark adaption and night visual perception are studied and tested; and research on perimetry and campimetry is being done.
4. At the US Naval School of Aviation Medicine vision testing equipment is being evaluated.

### **Army Eye Research**

Most of the ophthalmological research in the Army is being accomplished in the Eye Department at Walter Reed Hospital in Washington. This research is divided into three major categories:

1. Research on visual standards for various Army jobs, as well as visual requirements for admission to West Point and Reserve Officers Training Corps programs.

2. Ocular injuries and protective devices. For example, the effect of cortisone on ocular diseases, the handling of intraocular foreign bodies, the treatment of contusions, etc. Also glasses for gas masks, skiing, and other special tasks.

3. Selection and training of personnel to operate optical units for the dispensing and repair of spectacles.

Under Army contracts, Dr. Smelser at Columbia University and Dr. Kinsey at Harvard University have been working on the use of contact lenses. They have been interested in the effects of contact lenses upon the transparency, metabolism, and hydration of the cornea, as well as on the histological and vascular changes resulting from the wearing of such lenses. Studies have been made, also, of changes in the pH of the contact-lens solution which occur while the lens is in place on the cornea.

The Adjutant General's Office of the Army is conducting research on the relationship between photopic acuity and tests for night vision. Their major interest, however, concerns visual factors in job performance.

The Department of Ophthalmology at the Air Force School of Aviation Medicine, Randolph Air Force Base, San Antonio, Texas, has a large research staff working upon ophthalmological problems.

One interesting problem is the effect of anoxia upon the excitatory mechanisms of the retina and visual pathways. They have been able to show that in response to illumination of the eye of the rabbit that the visual cortex survived anoxia for about 2 minutes while the optic tracts were active up to a period of 5 minutes.

They found, also, that the phenomena of summation facilitation and inhibition are affected deleteriously in the very early stages of anoxia.

Following Conrad Berens' early work on visual fatigue, they have developed a new ophthalmic ergograph and have conducted a number of studies on this subject. They have been able to differentiate between normal subjects and those with asthenopic symptoms on the basis of ergograph findings.

The normals are characterized by: (1) increase in both accommodation and convergence, with a shift of phoria in the direction of esophoria; (2) marked increase in positive convergence with a slight decrease in divergence; and (3) these effects are transient and readings return to habitual levels within 30 minutes.

The asthenopes are characterized by: (1) decrease in accommodation with esophoria or no exophoria at near vision; (2) low prism divergence; and (3) fatigue of accommodation indicated by recession of the near point and none of the muscle balance changes found in normal persons.

As a result of these findings, it was recommended for aviators that the muscle balance for near vision should not exceed 2 prism diopters of exophoria, accompanied by a prism divergence of 12 to 15 prism diopters.

These findings are similar to Dr. Scobee's results obtained under a contract with the Office of Naval Research.

In the field of ocular refraction, the School of Aviation Medicine is investigating the use of contact lenses by pilots and the phenomenon of night myopia. Also, they are evaluating the use of visual screening devices for

purposes of selection of candidates for flight training.

A number of studies are directly related to air operations. For example, visual acuity tested with objects at high angular speed, motion parallax as a factor in depth perception, visual factors in reading flight instruments and radar scopes and color perception as related to the discrimination of flare signals.

### Summary

This brief survey of research conducted by the Armed Forces in the area of vision illustrates the relation-

ship of this research to clinical ophthalmology. It should be emphasized again, here, that the Armed Forces recognize the importance of preventive medicine, whether it be in the field, in the air or at sea, or in military industrial laboratories and shops. Every effort is made, both by research and in operating practices, to protect the eyes from damage by missiles, flames, chemicals, radiation, desiccation. When injuries do occur, treatment is prompt and efficacious. In cases of partial or complete loss of sight, rehabilitative measures are instituted long before the service man is discharged.

PUBLIC HEALTH AND THE PUBLIC.—There are five points with which, as a member of the public, I am concerned: the value of a periodical critical reassessment of programs; caution in the adoption of new programs; the need for economy in the training and use of personnel; the necessity for a closer integration of public health with the other branches of medicine; the desirability of having the community participate in public health planning. . . .

. . . The Medical Task Force of the Hoover Commission disclosed the fact that between 80 and 85 per cent of the total health expenditures of the Federal Government was for direct patient care and that only 15 per cent was available for preventive medicine, research and education. I have recently returned from England, and one of the more ominous implications of the British Health Service is a further distortion in the direction of curative medicine to the neglect of preventive services.—Eli Ginzberg, Ph.D., "Public Health and the Public," *Tomorrow's Horizon in Public Health*, 1950.

# The Blindness Research Program of the U. S. Public Health Service\*

W. H. Sebrell, Jr., M.D., *Director*

National Institutes of Health, Public Health Service, Federal Security Agency

DESCRIBES the prospective program of the National Institute of Neurological Diseases and Blindness and points out the function of voluntary agencies in forwarding such a program.

PASSAGE last year by Congress of a law authorizing the creation of a National Institute of Neurological Diseases and Blindness within the National Institutes of Health of the Public Health Service was the culmination of several years of study and effort by a number of voluntary health groups and professional societies. The part played by the National Society for the Prevention of Blindness in obtaining this legislation is but one of the many activities of the Society which, over several decades, has helped bring about remarkable advances in the control of blindness in this country.

Most of the past progress has been in the prevention of blindness due to infectious diseases such as syphilis and gonorrhea, and from accidents and occupational hazards. Comparable progress in the future will depend

on successful attack on blindness associated with the aging process and with such specific conditions as glaucoma, cataracts and retrolental fibroplasia.

## Four Major Needs

The four major needs for continued progress are: (1) increased numbers of specially trained professional workers for case finding, diagnosis, treatment, and rehabilitation; (2) expanded research—fundamental and applied—to develop knowledge permitting more effective management of the problem, particularly its preventive aspects; (3) closer coordination between the activities of all professional and lay groups and public agencies involved; and (4) increased funds to finance research and training.

Similar sets of needs, first demonstrated by private medical and health organizations, in recent years have caused the Congress to authorize the Public Health Service to establish

\* Extract of paper presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951.

National Institutes for cancer, heart disease, mental health, dental research, and arthritis and metabolic diseases. These Institutes, together with the Neurological Diseases and Blindness Institute and the National Microbiological Institute form the National Institutes of Health, the principal research branch of the Public Health Service.

### V. D. Campaign

The Public Health Service has already done extensive work directly and indirectly related to blindness prevention. One of the most important of these activities has been the Service's vigorous nationwide fight against venereal diseases over the past 15 years. Of equal importance has been the more than half century of organized and increasingly effective efforts by federal, state and local health agencies against many other infectious diseases such as typhoid, diphtheria, smallpox and tuberculosis. However, in spite of the great advances achieved in the control of infectious diseases, 22 per cent of blindness is still attributable to such causes. This is but another reason why the research and control efforts against infectious diseases must continue unabated.

### Recent Research Activities

Recent work related to blindness by the various Institutes at the National Institutes of Health includes the following:

Field investigations in Guatemala on onchocerciasis, a disease which affects some 20 million people in Central and South America and Africa. Among other reasons, these

studies were undertaken because increased travel between nations has increased the possibility of onchocerciasis being introduced widely into the United States. The National Institutes of Health studies resulted in the development of an effective treatment of the disease and work is continuing on methods of controlling the flies which spread infection.

Investigations over the past several years by the National Institutes of Health and other branches of the Public Health Service have been concerned with epidemic conjunctivitis, more commonly known as "pink eye," a usually mild disease that is widespread among school children in the southern states. In 1948 these studies definitely determined that the disease was caused by both the Koch-Weeks bacillus and by a bacterium thought to be *Hemophilus influenzae*. These investigations proved that the disease can be controlled with an eye-wash made of streptomycin.

Extensive nutritional investigations conducted at the National Institutes of Health ever since the discovery by Dr. Joseph Goldberger in 1915 that pellagra was a deficiency disease, have made many contributions to scientific knowledge of the relationships between nutrition and vision. At the present time, particular interest is directed toward the possible connection between retrolental fibroplasia and vitamin E deficiency. Other problems being studied are the causes of cancer which may involve the eye; the relationships between mental health and vision; between the

circulatory system and hypertension, which is thought to be associated with glaucoma; the problem of cataracts caused by exposure to radiation, etc.

### **Nearly 20 Million Budgeted for Research**

The major portion of the NIH budget, amounting to approximately \$18,300,000 in the current fiscal year, is granted to medical schools, universities, and other non-federal research institutions to support medical research projects and aid in the training of promising young scientists. Prior to the creation of the Neurological Diseases and Blindness Institute, a moderate amount of grants and training funds from various existing institutions were devoted to research in the various neurological diseases and blindness. In the specific field of blindness, grants in the fiscal year 1951 totaled nearly \$84,000, and for the entire field covered by the new Institute the total was \$410,000. These projects have been transferred to the new Institute and were reviewed at the first two meetings of the National Advisory Council on Neurological Diseases and Blindness. In the President's budget now being considered by Congress new funds totaling \$800,000 for support of research grants and training in the neurological diseases and blindness fields have been proposed.

It should be emphasized that these appropriations are for research and professional training in the research disciplines. Training and care of the blind, and of the victims of cerebral palsy, multiple sclerosis, et cetera, are the responsibilities of agencies

other than the National Institutes of Health.

In addition to the National Advisory Council on Neurological Diseases and Blindness, there are National Advisory Councils for cancer, heart disease, mental health, dental research, arthritis and rheumatism, and for general medical research in the fields not covered by the other councils. All applications for research grants received by the Public Health Service are first reviewed by panels of technical specialists from outside the Federal Government and then referred to the appropriate advisory councils, which are made up equally of non-federal scientists and representatives of the lay public. The applications are reviewed by the councils and recommendations passed on to the Surgeon General of the Public Health Service. Through the councils and study sections the interests of research institutions, of individual scientists, and of the public are represented in the administration of public funds for medical research. The councils and study sections permit thorough coordination of federal support of private research with the research conducted in the government's own laboratories.

### **Freedom of Scientific Inquiry**

The inflexible policy which governs the grants and fellowships program, as well as the work by individual federally employed scientists, is one of maximum freedom of scientific inquiry. Without this freedom for individual scientists research cannot produce the continuing flow of basic scientific knowledge which is necessary if this country is to maintain its



national strength and its position of leadership among the free nations.

A vigorous nationwide program of basic medical and biological research is fully as important as research directed toward the diagnosis, treatment and prevention of specific diseases. Illustrations of this are observed in nearly every important medical advance of recent years.

Fleming was hardly thinking of a specific treatment for syphilis when he began the work that was to lead ultimately to the development of penicillin. Wintersteiner was hardly thinking about the dramatic results to be achieved with the use of cor-

tisone in rheumatoid arthritis when he first isolated this substance two decades ago.

It is possible that great advances in the prevention of death from cancer may come from a laboratory study of the polio virus, or that the key to the ultimate control of glaucoma may come from basic study of the action of hormones. It is, therefore, of the utmost importance that laymen, physicians and laboratory scientists, alike, all understand and give their support to basic research in our universities, medical schools, hospitals, government laboratories and other research institutions.

**CONTROLS IN MEDICAL RESEARCH.**—It is not surprising that laymen develop many inadequate methods of treatment for various disorders that beset the human. If an ache or pain disappears after the use of this or that remedy, it is evidence enough, to the scientifically untrained, of the efficacy of the remedy as a cure. That one event precedes another in time is the first logical step in working out a cause and effect relationship. But our untrained friends, and, frequently, trained medical scientists, stop at that stage of reasoning and experimentation. The next step is to realize that time sequence makes possible a causal connection but does not prove it. That proof is what science demands.

On reading current medical journals, one is impressed by the number of articles which extol one or another form of therapy, but which frequently lack proof of scientific merit. The great number and variety of incompletely tested treatments that are proposed as being of value, often for the same disease process, stand in bold contrast to the few which are rigidly tested according to accepted scientific criteria. —Otho B. Ross, Jr., M.D., "Use of Controls in Medical Research," *The Journal of the American Medical Association*, Vol. 145, No. 2.



## Research in Glaucoma\*

Eugene M. Blake, M.D., *Clinical Professor of Ophthalmology*

*Yale University, New Haven, Conn.*

POINTS out the most recent researches in glaucoma, emphasizing the need for early recognition.

THE problem of research in glaucoma needs a twofold attack: (1) a study of the eye itself where the visible and perhaps almost invisible results of the exciting factors are manifest; and (2) a study of the individual whose eyes have developed the disease called glaucoma.

### The Eyeball

Let us consider first which problems of research may be directed to the eyeball itself. Although much has been learned as to the method by which the aqueous is derived from the circulating blood, further research is indicated regarding the thin barrier of tissue or cells which separates these two fluids. This we call the blood-aqueous barrier. The watery element comes from the vessels of the ciliary processes and the walls of the capillaries in this region serve as semipermeable membranes. Under normal

conditions there is an equilibrium of osmotic pressure, which if increased on the blood side will cause an excess of the watery portion. Kinsey and Grant believe that electrolytes which are formed in the ciliary body, if in excess, lead to a greater volume of water in the anterior chamber. The condition of the blood-aqueous barrier with its osmotic function is controlled by the autonomic nervous system. This small area of the eyeball is a very important one and undoubtedly to date withholds many of its secrets from the research worker.

Determination of the amount of acetylcholine and of cholinesterase in the aqueous of normal and glaucomatous eyes and how these substances may be altered by drugs or surgery will be of great value. The work of Bloomfield, who demonstrated the lack of acetylcholine in the glaucomatous eye and its presence in the normal eye, could be expanded with benefit. Further knowledge of these substances, what stimulates their

\* Extract of paper presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951.

formation, what drugs alter them and how they arise will greatly facilitate the treatment of the disease.

The question of histamine and histamine-like substances in the ocular tissues, including the aqueous and the vitreous, are indicated to determine the rôle such substances play. According to Duke-Elder their liberation in the eye may cause acute vascular crises through increased permeability of the intraocular vessels. Especially desirable is more knowledge of the percentage of cholinesterase in the ocular structures. Vidal and Malbran believe that the first change in primary glaucoma is an increase of this substance in the tissues which normally contain it, such as the iris, ciliary body and the retina. Later the tissues which do not normally contain the esterase, that is the vitreous and the aqueous, do show its presence. This excess leads to circulatory changes and ocular edema. Opposed to this statement is the work of de Grósz, who demonstrated the presence of small amounts of cholinesterase in the aqueous of normal eyes and an increase in glaucomatous eyes. This point calls for clarification by further investigation.

More studies on the presence and extent of vascular changes in the capillaries and arterioles of the anterior segment of the eye should be made to substantiate the work of Just Tiscornia. He found low intraocular pressure in sclerosis of the arterioles but that alterations in the veins lead to increased tension. This problem is tied up with the research on acetylcholine, since capillary activity is under control of the parasympathetic system in which acetylcholine is the chemical intermediary.

### The Vitreous

The rôle of the vitreous in the production of glaucoma has been considered for many years. Originally it was thought that glaucoma could be explained by a swelling of this tissue. This would account for the pushing of the iris and lens forward and the increased pressure within the eye. The discrediting of this view seemed to force the rôle of the vitreous into the background. Recently however, John Evans has drawn attention to the fact that this tissue plays a more important part in the elimination of fluids, both in normal and glaucomatous eyes. He points out that the vitreous permits fluid transfer between itself and the retina and showed by injection of stains that cleavage planes exist, which direct fluid to the region of the optic nerve. Evans feels that the amount of drainage by the posterior portion of the eye is greater than is generally realized because of our concentration upon the study of the structures about the anterior chamber. Further elaboration of this work should be made.

### Aqueous Veins

The presence of aqueous veins and their relation to the passage of aqueous from the anterior chamber has been demonstrated by Ascher. Their connection with the canal of Schlemm may be of great importance in the maintenance of normal intraocular tension. Ascher suggests that histological verification should be supplied for the working hypothesis that a transient or permanent narrowing of the canal outlets seems to be connected, or may be responsible for, the increase in pressure in some

eyes, particularly the type of glaucoma with the wide angle. Clarification of this point should be possible.

### The Individual with Glaucoma

Let us now consider some types of research which may profitably be pursued in respect to the individual who develops primary glaucoma.

Jean-Gallois of Paris, winner of the 1950 international prize for research in glaucoma, states that the examination of the eyes of a glaucoma patient should be accompanied by a *complete* general examination, a procedure which he has followed for 21 years. This phase of investigation is all too frequently neglected. I believe that if all of our glaucoma patients could be subjected to a thoroughgoing examination, a mass of data could be accumulated which would be of great value.

Among the constitutional disturbances which play a part in the production of glaucoma, we must consider heredity, vascular changes, neurological aspects, emotions and endocrine disturbances.

While glaucoma is not an inherited disease, its frequent occurrence in the offspring of a glaucomatous parent is all too common to be overlooked. It is important that such offspring should be warned, without frightening them, of the desirability of being on the watch for the disease after, say, the age of 35. I am sure that the hereditary factor is very important.

The condition and function of the blood vessels, not only of the eye, but of the body in general, are of great significance in the investigation of glaucoma. While the general blood pressure seems not to be related to

intraocular tension, the histological changes which occur with the arteriosclerosis of advancing years is of great moment. Magitot has shown that the genetic degeneration of the intraocular vascular system is only a part of a similar condition elsewhere in the body. Research is needed especially into the possibility that vasodilators and substances which affect the permeability of vessel walls may so regulate the interchange of fluids that tension may be controlled by such medication rather than almost complete dependence upon the use of local remedies to the eyes, or surgery. This is a promising goal and one which is greatly to be desired. It has been pointed out frequently that in glaucoma the vascular change is venous, rather than arterial. Medication which could alter especially the venous side of the circulation might be productive of great benefit in treatment.

### Psychosomatic Aspects

Treatment, plus research, is needed for the part which emotions play in the production of glaucoma. That worry, anxiety, grief and fright are active factors in the development of glaucoma is undeniable. Research in the field of psychology of these patients could perhaps throw light upon the relationship of the psyche and glaucoma.

Work still remains to be done in the field of nervous control, especially of the blood vessels. Elaboration of the work of Magitot and others upon the function and effect of stimulation of the diencephalon, or "between brain," and glaucoma offers hope of better understanding of the whole

problem. How sensory and other stimuli are integrated into the autonomic vascular responses, which result in the production of acetylcholine, sympathin and related substances is a challenging problem for the laboratory worker. Since abnormal behavior of the glycemia curve has been attributed to a disturbance of portions of the diencephalon further study of this question may throw light on the causation of glaucoma.

### Hormones

One field which seems to be fruitful in investigation of glaucoma is the part which the endocrine glands play. That they are involved seems unquestionable, but which glands are chiefly involved and how their hormones fit into the picture is all too uncertain. Increasing knowledge in biochemistry offers hope of eventually

clearing up the importance of the endocrine structures in glaucoma.

### Summary

Since an estimated 12 per cent of blindness in this country is due to glaucoma, it is patent that research is greatly needed to discover better treatment of the disease. Research is an expensive undertaking and we must all work to encourage people with means and the various foundations to aid us in this urgent need.

Increasing interest in research in glaucoma, plus an awakening of interest in people in general on the subject, is manifest. Appreciation of the seriousness of the disease, early recognition and faithful study by the physician, and cooperation by the patient, all combine to make the outlook for the glaucoma patient brighter.

PUBLIC HEALTH AND THE SCHOOL.—Teachers are also frequently in a position to notice a child's deviation from his usual behavior. A teacher who is interested in her children, has lived intimately with them over a period of time, and knows their customary reaction, has much to tell professional health workers about the normal reactions of particular children. Obviously this has important implications for school health workers.—Ernest G. Osborne, Ph.D., "Public Health and The School," *Tomorrow's Horizon in Public Health*, 1950.

# The Place of Management in Eye Conservation\*

R. E. Gillmor, Vice-President

The Sperry Corporation, New York, N. Y.

DESCRIBES the forward-looking eye conservation program of the Sperry Corporation and its resultant reduction in accidents.

THE phenomenal productivity of the American people is the result of free competitive initiative. Progressive management realizes that an essential element in this competitive system is maximum productivity per unit of human effort. Maximum productivity cannot be attained unless management gives great attention to the human values within industry, and especially the protection and maximum utilization of the skills of the human being. Basic to the utilization of all skills is eyesight. The best way to illustrate the importance of measuring and utilizing visual skills is to describe the eye clinic of the Sperry Gyroscope Company and how it came to be established.

During the past war, Sperry was obliged to expand its personnel from less than 2,000 to more than 32,000. Many of the men and most of the women had never worked in industry before and therefore had to be carefully selected and trained for the tasks they were to perform. This

\* Presented at the Conference of the National Society for the Prevention of Blindness, March 29, 1951.

rapid expansion of a highly complex industry could not have been accomplished without: (1) the measurement of the inherent aptitudes and skills of all applicants; (2) the most intelligent possible use of those inherent qualities; and (3) an extensive training program.

Near the beginning of this rapid expansion program we discovered serious discrepancies in the performance of a large number of girls engaged in the calibration of air instruments. There was every evidence that all of the girls were intelligent, earnest, and had the necessary manual dexterity for the job. It was obvious, therefore, that there was some other factor which we had overlooked. Our factory manager asked the advice of L. Holland Whitney, M.D., who was then our medical director, and he finally came to the conclusion that the discrepancy in the performance of the girls was due to differences in their visual skills. This was finally narrowed down to the difference in the near vision acuity which was required for this meticulous and ex-

acting job of instrument calibration. The girls without this quality were placed on other jobs, and employees with the necessary near vision acuity took their place, with a consequent high and uniform performance.

### **Measuring Visual Performance**

This early experience led to the adoption of a means for quickly measuring visual performance and the adoption of a procedure for matching the visual performance of the operator to the visual requirements of the job. The instrument employed for this measurement was the Ortho-Rater developed by Bausch & Lomb. Similar instruments, I understand, are now available from other companies. With this instrument it was possible to measure quickly 12 factors of visual performance and to determine whether the person required corrective glasses or a change in the prescription of the glasses being worn. The 12 factors of visual performance were: near vision acuity and far vision acuity for both eyes, and for each alone (6 measurements); muscle balance—that is, the ability of the two eyes to work as a team on near and far vision with the eyes horizontal, and the same with the eyes in the vertical (4 measurements); depth perception, and color vision.

The girl who operated the instrument developed a very good technique for putting the employee at ease, then making the measurements quickly, and simultaneously punching them on the margin of a card. If the subject did not wear glasses the measurements could be completed in an average time of 5 minutes. From the punch marks on the margin a profile curve of the applicant's measurements

was made on the same card. Every job requiring visual skill was analyzed and transparencies made showing the profile for the job. By matching profiles, employees were fitted to the jobs for which they had the necessary visual skills. No employees were ever discharged by reason of this process. It was simply a problem of fitting the jobs and the individuals together.

### **Installation of Eye Clinic**

A study of the problem of eye protection led to the conclusion that the employees who were obliged to wear corrective glasses could not be relied upon to wear safety glasses over them. In other words, we could not divorce eye protection from correction. This led to the installation of an eye clinic for determination of the correction required, and issue to the employee, without charge, of safety glasses with correction where necessary, and plano lenses for those not requiring correction.

The equipment of the clinic included instruments ordinarily used by eye specialists. It was under the direction of two highly qualified optometrists, Richard Feinberg, O.D., and Herman Sager, O.D., and proved so valuable that it was continued after the war, notwithstanding a great reduction in the number of employees. It is now proving very helpful in the examination and placement of the rapidly increasing numbers of new employees.

Although the primary purpose of the clinic has been the measurement, correction and utilization of visual skills, it is also of value in diagnosing in their incipient stages such eye diseases as cataract and glaucoma, as well as such general pathological

conditions as diabetes and high blood pressure. It has also led to the development of special types of eye correction, such as that required for drill press operators who cannot wear ordinary bifocals and must therefore have special lenses which will give them the best compromise between near and far vision.

### **Misgivings Allayed**

When the company first installed the eye clinic and adopted the policy of free issue of corrected safety glasses, the management had some misgivings because of the cost, estimated to be \$60,000 a year. The unions feared that it would result in the discharge of employees with defective eyes. The local opticians and eye specialists were sure that it would reduce their practice. As it turned out, the company saved several times the cost in eye compensation cases alone, not to mention increased efficiency; no one was discharged by reason of defective vision; and the practice of the local opticians and optometrists was increased because most of those who had their vision corrected for the first time with safety glasses wanted another pair for ordinary use. Many urged their wives or children to go to the local eye specialist for examination.

In one group of 300 highly skilled men over 38 years of age, 68 had

never had an eye examination and three-fourths of these 68 needed correction. Of the 232 who had been previously examined, two-thirds required a change in the prescriptions of their lenses. The lesson learned from this and similar experiences with other groups was that people do not seek eye care until definite symptoms force them to do so.

### **Marked Reduction in Accidents**

Accidents are the most cruel form of economic waste. In Sperry, 18 months after the institution of an eye protection program as part of an over-all safety effort, the accident frequency was reduced by 54 per cent and the severity rate by 29 per cent. The loss ratio for compensation insurance was reduced from 84 to 51 per cent.

This experience of Sperry Gyroscope Company proved again what has so often been proved by many managements: that anything which contributes to the welfare and harmony of the human being on his job contributes also to the profitability of the industry. The potentialities of most people are much greater than are ever utilized. Management has the responsibility of finding and utilizing these potentialities to the maximum degree for the good of the employee, the customer, and the stockholder.



# Practical Aspects of Eye Protection \*

Russell N. Crosby, Supervisor of Safety and Claims

American Car & Foundry Company, Berwick, Pa., Plant

DESCRIBES the eye protection program of one of the branches of the American Car & Foundry Company, stressing the pre-employment visual examination for greater efficiency.

**T**WO factors are essential to the successful operation of an eye protection program: full cooperation of management, and complete understanding of all employees concerning the program's sight-saving objectives.

An employee new to the plant may be just out of school or he may be a worker seasoned in industrial activity. In either case he is usually given a physical examination before he is allowed to work. This examination, which is becoming more and more detailed as the years go on, should include careful attention to his visual capacities. Thus the worker may be placed where his special skills are used to best advantage. This type of examination not only is a guide for employee placement, but constitutes a permanent record of vision.

## Goggles Provided

In practically all industries that involve any eye hazards plano safety

goggles are furnished to the employees. Too often the individual is told: "Wear these goggles at all times." He then goes off to start the work assigned to him. He does not know where to go for repairs or adjustment of any kind; he is allowed to live and learn the hard way. Frequently such an individual returns for adjustment by way of the plant hospital; another eye casualty that can be charged to lack of information.

## Adjustment and Instructions

When the employee receives the safety glasses or goggles he should be assigned not only to someone who knows how to adjust them properly, but also to someone who understands the type of work that will be required of him. This is a good time to instruct the employee carefully as to the importance of wearing proper eye protection. If the foreman is well informed concerning the safety conditions of the department and the plant, he will be in a position to give the new employee an excellent safety

\* Presented at the Conference of the National Society for the Prevention of Blindness, March 29, 1951.



foundation. If, on the other hand, the foreman is poorly informed or takes the attitude that production is his only responsibility, the employee may take the attitude that safety is secondary and of little consequence within the department. It is a well-known fact that where responsibility for safety has been given to the foreman accidents have been less frequent.

Replacement and repair stations should be set up at a central place. Employees can then have their goggles and other eye protective equipment attended to with a minimum amount of time lost from work. If it is impossible to set up such a center the foreman should have a supply of goggles and other eye protective equipment to distribute as needed. Thus there will be no excuse for working without proper eye protection. Any foreman who desires safety in his department can have it; and by the same token, any individual who wants to work safely can do so.

In any large establishment there will be a number of men and women who need safety glasses or goggles with prescription lenses. These individuals require special care in examination and adjustment. Until the prescription glasses are ready, the employee should be given some kind of temporary eye protection. Corrective safety eyewear should be made up only from a doctor's prescription, and a doctor should also make the final adjustment.

### **Follow-through Needed**

Some type of follow-through is necessary in a well-rounded eye protection program; this to be the responsibility of the plant physician,

safety engineer, foreman, and others concerned. Frequency of eye accidents indicates some underlying cause. If the foreman notices in an individual's work any difference in efficiency and tempo of production, an eye examination should be suggested. Records may show that an employee has not had such an examination for a long period of time. Under a good follow-through program this does not occur. Safety inspectors may find other conditions that lead to poor vision; and these should be corrected immediately.

### **Safe Environment Essential**

Safety begins with an adequately lighted, clean, and well-guarded industrial environment. If the lighting is not up to standard, production is affected and each employee becomes a potential hazard. Some factors to be checked with reference to lighting are: uniformity, light shields and glare, proper type of reflectors, proper voltage, maintenance, clean shades, breakage and explosion conditions.

At any plant where there are rules and regulations set down by the management for the employees to follow there must of necessity be some definite and sound procedure for exacting penalties of those employees who wilfully disobey the rules. The various plants of American Car and Foundry Company have such regulations. They are a direct order from the district manager, or works manager, and must be carried out, not only by the hourly worker but also by the members of the supervisory staff.

### **Safety Rules and Penalties**

Every prospective employee is given a copy of these rules and regulations.

If he has any question concerning their application it will be explained to him, so that there is no misunderstanding right from the start of his employment. At the Berwick plant of American Car & Foundry Company, the plant rules are divided into four sets, grouped according to their importance. Each group has penalties for violations. For "failure to wear goggles within the plant property other than while in offices": first offense, a warning slip; second offense, a one-day layoff; third offense, a five-day layoff; fourth offense, suspension subject to discharge. It is the foreman's responsibility to see that these penalties are carried out.

It is not our intention in establishing such rules to maintain a police force within the confines of our plant; nor is there any intention to place restrictions on the personal rights and freedom which we all cherish. But certain regulations are necessary for the safety and well-being of the personnel in order that all may work efficiently, safely and effectively. Em-

ployees who disregard regulations must be governed by the consequences of their disobedience.

### Summary

In summing up some of the practical aspects of eye protection we can consider the following to be of value:

Complete visual examination at the time of employment.

Follow-through, with re-examination at least every two years.

Greater care in adjustment and maintenance of eye protective equipment.

Foremen's awareness of their safety responsibility.

Proper illumination of work areas. Follow-through program on physical aspects of eye protection.

Cooperation, understanding, and education of all employees concerning proper care of the eyes and the importance of good vision.

Definite penalties for infractions of rules and regulations set up by management.

## The Government Agency in Prevention of Blindness—A Panel Discussion\*

Chairman: Carl E. Rice, M.D., Consultant in Ophthalmology

Office of Vocational Rehabilitation, Federal Security Agency, Washington, D. C.

DISCUSSES what federal, state and local health agencies are doing now in the fight against blindness, and what their plans are for the future.

**D**R. RICE introduced the topic under consideration by saying:

If this program concerning the responsibilities of government agencies had been held 50 years ago, one could have had only two representatives on the panel—maybe three. They would have been the United States Public Health Service, a state health department, and a metropolitan health department, or a metropolitan education department. Today, if one desired to have all agencies that felt an interest in this subject on the platform, the list would have included at least 21, and it is possible that some might have been missed in such a count.

All the activities concerned with sight conservation may be classified under five broad headings: (1) education; (2) services—medical and those related to medicine; (3) research; (4) case-finding and (5) policing.

\* Excerpts of discussions presented at the Annual Conference of the National Society for the Prevention of Blindness, March 29, 1951.

### Prevention Through Federal Activity

Representing the United States Public Health Service, A. L. Chapman, M.D., said:

The National Society for the Prevention of Blindness performs an important function in pulling together the separate and too often uncoordinated activities of private agencies and individuals as well as governmental agencies who are interested in sight conservation. Certainly governmental agencies today have only a segmental interest in the total problem of loss of sight, and the reason for that is that public interest has not been sufficiently strong to bring about the appropriation of funds that are needed to engage in sight conservation on the large scale it deserves. However, many of the activities of the Public Health Service, and many of the state and local health departments, have contributed more or less in-

directly to the prevention of blindness.

Sight conservation has truly been a by-product of other public health activities. A very promising recent development, for instance, was the establishment in the Public Health Service of the National Institute of Neurological Diseases and Blindness within the National Institute of Health. As soon as this is properly financed, there undoubtedly will be research to find the etiological causes of glaucoma, cataracts, and other eye defects.

#### ***V.D. Control***

The Communicable Disease Center in Atlanta is still carrying on a battle against infectious diseases, many of which contribute to loss of sight. The Division of Venereal Disease in Washington has played an important role in sight conservation by bringing about a decrease in the amount of gonorrheal infections and syphilis.

#### ***Glaucoma***

Sight conservation is a public health "natural." It lends itself to mass case-finding whereby early glaucoma, cataracts, and vision defects can be detected early through vision screening, tonometry, and personal observation; and something can be done to improve or conserve vision in most of these conditions.

The vision of persons with early glaucoma can be helped by medical care, surgery, and good follow-up work, and many blinded by cataracts can see again if surgery is done. The myope, the hyperope, and astigmatic can be fitted with glasses. Accidents can be prevented. In-

fectious diseases can be aborted. In what other existing public health program can so much be done for so many people for the same amount of money?

#### ***Industry***

Sight conservation is an activity in which almost every governmental agency of necessity is interested. Welfare agencies are concerned with the financial burden and loss of earnings of visually handicapped clients due to sight loss. Educators have a real interest in visual deficiencies. The experts tell us 85 per cent of our learning comes through our eyes. Many maladjusted and backward students commonly thought of as mentally handicapped might better be classified as visually handicapped, if the facts are known.

Industry has much to gain by sight conservation. Approximately 50 per cent of workers have defective vision, and 90 per cent of these defects can be corrected. It also has been shown that where ample lighting is provided and vision defects are corrected, there is a significant increase in the productivity of workers as well as reduction in the number of industrial accidents.

#### ***Highway Safety***

Highway departments and police departments can make a substantial contribution to highway safety by concerning themselves with the vision status of prospective drivers. Only 20 of our 48 states check on the vision of applicants for automobile licenses, yet one or two per cent of all drivers have vision in only one eye, and 30 to 40 per cent of all drivers have one eye with a vision less than 20/30.

Army records have shown that one-eyed drivers are from six to ten times as liable to have defective judgment of distances as are drivers with normal vision, so a sight-conservation program could make a real contribution to traffic safety.

### **Opportunities for Prevention Through Public Assistance Programs**

Miss Constance Hastings, associate representative of the Bureau of Public Assistance in the New York region, pointed out that the Federal Security Act does not specify a particular definition of blindness. She said:

It recommends a broad definition within limitations specified in the act. That means that states can use what is frequently called "an economic blindness" as the basis upon which eligibility for aid to the blind is determined.

The prescribed methods of determining eligibility for aid to the blind are . . . a factor in prevention of blindness. The examination to determine blindness must be made by an approved examiner. Until this year the requirement has been an ophthalmologist in order to determine what kind of medical or surgical treatment might improve sight, but there is an amendment to the Social Security Act this year which permits optometrists to make that examination. Another requirement which seems important is that there must be a signed and written report of the examination, and that this report must be reviewed by a state supervising ophthalmologist.

#### ***State Supervising Ophthalmologist***

The state supervising ophthalmologist has been a key person in

the program and his multiple jobs have a great deal to do with strengthening the program for prevention of blindness. He reviews the reports to be sure that the examiner has made correct determinations. From these reports he may see some possibility of treatment, or of referral to other agencies, and he makes recommendations which are followed by local staffs. Further, from these reports he obtains valuable research material.

In general the very best we can do as assistance workers in the field of assistance to the blind is to have our workers, in their day-by-day job of administering assistance to people, sufficiently sensitive so that they will notice a sight-conservation problem. For instance, one of our workers was visiting in a home which was receiving aid to dependent children. She noticed one of the children, who was three years old, playing with his toys in an unusual way. She asked about it. The family had not been too well aware that there was a problem, though they knew he always played that way. That child was promptly referred for an eye examination and steps were taken to prevent blindness which might have occurred eventually, if not caught in time.

### **New York State's Prevention Program**

Miss Ruth B. McCoy, Assistant Director, Commission for the Blind, of the New York State Department of Social Welfare, reported, in part:

The New York State Commission for the Blind is charged by law "to continue to make inquiries concern-

ing the causes of blindness and to learn what proportion of these cases are preventable and to take steps to inaugurate and to cooperate in any such prevention measures for the State of New York as may seem wise."

Mandatory reporting of blindness to the Commission has been in effect since 1945; however, reporting the blind and seriously impaired vision cases dates back to 1913, when it became the duty of the Commission to maintain a register of the blind. About 15 years ago, central classification to determine the "blind" and "not blind" cases was established for all agencies working in the state with eye cases.

Sight conservation is promoted by the Prevention of Blindness Service of the Commission through educational programs, social case work and study and review of ophthalmological reports.

The prevention educational work aims to acquaint the network of professional workers throughout the state with the methods of early case finding, resources for eye examination and treatment, and what constitutes adequate follow-up care, with continuous emphasis on vision tests for the preschool-age child.

Of further aid is the state Education Law, which makes it mandatory for all school children, starting with the first grade, to receive a vision test annually, and when necessary to be referred to the family physician.

Financial arrangements for medical care are provided through the Social Welfare laws, the Children's Court Act and the federal-state programs.

### Missouri's Official Program

The next speaker was Mrs. Lee Johnston, chief of the Bureau for the Blind, Department of Public Health and Welfare for the state of Missouri, who explained that the Missouri Commission for the Blind, created in 1915 by act of the General Assembly, is charged by the law creating it with the duty of adopting such measures as the commission may deem expedient for the prevention and cure of blindness. She pointed out, however, that Missouri does not have a compulsory law for reporting cases of blindness. She said:

The Blind Pension Law of Missouri, which was passed in 1921 and which is wholly financed by state funds, stipulated that no person should be entitled to benefits who refused to submit to treatment or operation to effect a cure, when recommended by examining oculist and approved by the commission, with a further provision that no applicant who is more than 75 years of age should be required to submit to an operation or treatment who comes under the provisions of the law. It has, therefore, been incumbent upon the Commission for the Blind (now the Bureau for the Blind) from the very beginning to conduct a program of remedial care for blind persons. This program—as a part of the broader function of prevention of blindness—has had varying success throughout the years, sometimes severely limited by lack of funds.

In the beginning, limited funds were allocated for prevention of blindness and were used to restore the eyesight of persons who had



applied for the Blind Pension and who were ineligible because of recommendation for eye care.

### ***Trachoma Control***

Trachoma was recognized as one of the most prevalent eye diseases in Missouri and the State Board of Health was urged to adopt such measures for inspection and quarantine as the prevalence of trachoma in any district might render necessary. The United States Public Health Service founded the Trachoma Hospital at Rolla, Missouri in 1926, and state funds have been appropriated to the Board of Health for its support since 1933. All cases of trachoma which come to the attention of the Bureau for the Blind are referred to the Trachoma Hospital.

In 1938 the funds of the commission were exhausted and it was necessary to discontinue the services of the Commission for the Blind until October, 1941. At that time they were resumed with a grant of \$50,000 from the state legislature derived from general revenue which was for the sole purpose of re-examining and reinvestigating recipients of the Blind Pension to establish their continuing eligibility. The act which granted this sum of money strictly prohibited its use for any other purpose than that specified.

### ***Local Lions Clubs Aid***

Clinics were held in every county seat and all recipients of the Blind Pension were examined, but, unfortunately, those whose conditions could be remedied by operation or treatment could not have this service under the funds granted by the state.

The Lions Clubs of Missouri were then asked to participate, which they very generously did, and during the 15 months of the biennium during which this investigation was proceeding, 27 persons had vision restored by operation.

### ***Prevention Committees Organized***

The next legislature, convinced that it is not only humanitarian, but more economical for the state to give eye care rather than grant pensions, appropriated funds for a prevention of blindness program. In order to carry this on and to obviate criticisms with regard to medical indigence of the persons being served, it was determined that a Prevention of Blindness Committee should be organized in each county of the state with the exception of St. Louis and Kansas City. Free facilities for eye care can be had by residents of those counties and it was not deemed well to overlap this service since funds were limited. These committees were appointed in the late months of 1943 and were composed of professional and lay persons in the county who were interested in the welfare of its citizens.

### ***Cooperating Ophthalmologists***

When the program was inaugurated in 1944, a fee schedule was presented to the Missouri Medical Association for its approval, and it was agreed that the individual ophthalmologists could cooperate with the Bureau for the Blind for such nominal fees if they wished. The schedule was presented to each of the 78 cooperating ophthalmologists and was accepted by them. After surgery has been performed,



the necessary follow-up visits to the ophthalmologists are authorized and the prescription for glasses is taken care of in whatever way it is possible to provide.

Two ophthalmologists always attend our clinics so that they can confer on serious cases. After the clinics are held, the social worker who has assisted at the clinic remains in the county to visit the applicants for whom surgery was advised. She talks with them calmly in their homes rather than forcing them to a decision during the excitement of the clinic. To many of them, "cutting on the eyes" is something to be greatly feared.

### ***Some Achievements***

Since January 1, 1944, when the committees began to function, there have been 7,266 referrals. Of these, 6,251 persons have been examined. Twelve hundred forty operations have been performed. Of these, 619 were cataracts; 78, needling after cataract; 601, iridectomies; 83, strabismus cases; 92, glaucomas, with 111 persons under continuous care for glaucoma; 11, plastic surgeries; 9, detached retinas; 8, dacryocystectomies; 92, enucleations; and 144, pterygia.

Five hundred and forty-nine pairs of glasses have been furnished by the Bureau for the Blind and 942 by others. Two hundred persons referred and examined in our clinics, or by our ophthalmologists in their offices, were found to have trachoma and have been sent to the Trachoma Hospital at Rolla; 30 children have been referred to the Missouri School for the Blind; 6 persons have been referred to the Missouri State Cancer

Hospital; and 97 persons who are of suitable age and physical condition have been referred to our own Vocational Rehabilitation Department.

### **Prevention and Vocational Rehabilitation**

Mr. A. Ryrie Koch, New York regional representative of the Office of Vocational Rehabilitation, raised the question of the relationship of the vocational rehabilitation programs to the prevention of blindness, pointing out two major areas in which it has the closest relationship. He said, in part:

One is the medical examination. In every case when a person applies for rehabilitation, he must first have a general examination. Even though the individual came in with a disability which may mean amputation, the general medical examination may reveal some eye condition or disease. If the general examiner discovers an eye condition, he is expected immediately to send the patient to an eye specialist so that the proper treatment can be given. Thus the element of prevention occurs in the initial medical examination.

Medical, surgical and hospital services may be provided for the individual if he is not able to provide them himself. When an individual is discovered to have an eye condition, it is corrected before beginning training for an occupation. The rehabilitation agencies never train around a person's handicap but try to restore the maximum of the person's capacity before they undertake any long range vocational training.

## **Sight Restoration in Schools for the Blind**

The final speaker was Dr. Gabriel Farrell, of Perkins Institution, Watertown, Massachusetts, who declared:

Ideally, a school for the blind should not have to be concerned about the prevention of blindness because it would be assumed that a child is not sent to a school for the blind until the medical profession has done all that is possible either to prevent his loss of sight or to restore his vision within the medical and surgical area. Yet when a school such as ours has been able within the past five years to send back to public schools, regular classes or sight-saving classes, sixty-one children, it does show that there is something which schools for the blind can do. The work being done in this area, however, is restoration of sight rather than prevention of blindness.

In schools for the blind there ought to be very careful studies of the visual problems of the pupils and steps should be taken, when possible, to improve vision. Good medical and surgical care is a major factor, but good environment and nutrition are also contributory factors in helping to restore sight. We have had a number of children

## **How to Prevent Hereditary Blindness**

Pointing out that nearly twenty-five per cent of all blindness is due to hereditary causes, Dr. Farrell said: "We have some charts of studies made of our pupils over the last 120 years, showing three and four generations of pupils who have come to us from the same families. These studies, however, show that these cases were more common fifty or seventy-five years ago than they are now, but too many are continuing to the present day. Schools for the blind may help to prevent hereditary blindness by pointing out to boys and girls who are blind from hereditary causes the social responsibility they have, and that therefore they should think very carefully as to whether or not they want to extend their blindness into another generation."

who have come from substandard homes and who through the good living conditions provided by the school for the blind have had their sight restored sufficiently to return to schools in their home communities.

# A Public Health Approach to the Prevention of Blindness<sup>\*</sup>

Leonard A. Scheele, M.D., *Surgeon General*

Public Health Service, Federal Security Agency  
Washington, D. C.

INDICATES that the major problem ahead is especially concerned with the reduction of blindness due to conditions arising from chronic illness and old age.

"AT least 50 per cent of blindness is preventable!" This is the encouraging keynote of the National Society for the Prevention of Blindness. There are many voluntary agencies concerned with major killers and cripplers of our times; but very few of them can make such a statement with the confidence which past success and present promise impart to your organization.

What a proud record it is! The battle against blindness has brought about a 90 per cent drop in blindness due to eye infections in the newborn, since the Society was formed in 1908. During the past 15 years alone, blindness due to syphilis has dropped by 50 per cent; and during the same period, despite a war and high levels of industrial employment,

a 25 per cent drop in blindness due to injuries!

No one in the field of public health—least of all the members of the National Society for the Prevention of Blindness—is content with these past accomplishments, however. All of us are concerned that more than 1,500,000 Americans are blind or partially blind—and that 22,000 new cases of blindness are added each year.

These figures admittedly are low estimates. We actually have no idea of how many people in this country have impaired vision without proper corrective treatment. We have no idea of how many have the beginnings of serious eye disease which, without discovery and treatment, will eventually take their sight. Finally, there are many conditions affecting the eyes and vision about which medical science knows very little.

<sup>\*</sup> Presented at the Conference of the National Society for the Prevention of Blindness, March 29, 1951.

The situation in the field of sight conservation parallels that in the general field of public health. Success in combating the infectious diseases has prolonged life but has brought about striking increases in death rates and illness due to chronic diseases. Thus, our success in reducing blindness due to infections and mechanical injuries has shifted emphasis to such conditions as cataract, atrophy of the optic nerve, glaucoma, and corneal disease. We have learned to cope effectively with the most acute public health problems of fifty years ago; but we are not dealing adequately with the major problems of today. In many instances we have not yet developed a foundation of scientific knowledge upon which to base future progress.

During the past five years, the American people have become increasingly aware of the threat of chronic disease and impairment. As a result there have been many important developments in the field of public health. Through their voluntary health agencies and their representatives in Congress, the people of this country have begun a nationwide attack on the major killers and cripples of modern times.

The current battle in America against chronic disease has no parallel elsewhere in the world. The pattern is typically American: the people as individual citizens have given generous support to the voluntary agencies. The agencies, in turn, have aided in the establishment of governmental programs to supplement voluntary efforts. In the Public Health Service, for example, research institutes on mental health, heart disease, dental disease, arthritis and metabolic dis-

eases, and blindness and neurological diseases, have been established since 1946. In the same period, our cancer program, which was established in 1937, has been greatly expanded.

### Research

It is of special significance that research is emphasized in each of these Public Health Service programs, and in the programs of voluntary agencies concerned with the same conditions. Moreover, the research resources of both the Public Health Service and the voluntary agencies are channeled chiefly into the fields of basic research.

The importance of basic research cannot be overemphasized. Until we have a great deal more fundamental knowledge on the causes of cataract, for example, we will continue to be handicapped in our efforts to detect the condition in the early stages, and to halt its progress. Without such knowledge, primary prevention of this condition as well as of glaucoma and other serious diseases of the eye will remain a pious hope.

It is only on the basis of new knowledge that we shall be able to make any impressive new gains on blindness. At the present time, less than a million dollars a year from all sources is spent for research on blinding diseases of the eye. Contrast that small sum with our country's annual expenditure of more than \$125,000,000 in services to the blind. Contrast it, if you will, with our annual expenditure of almost \$8,000,000 for eye lotions and eye cosmetics!

Blindness is one of the most extensive "gap areas" in medical research. Our lack of basic knowledge is not due entirely to a lack of funds

for research, although this is the major obstacle. We are forced to admit, however, that it is often difficult to interest investigators in the basic problems of a condition so diverse in its origins and manifestations.

Only a few years ago, I recall, this attitude prevailed with respect to cancer. The bulk of cancer research was directed toward improvements in surgery and radiation therapy. Today, most of the small research effort on blindness is also devoted to the end problem. The stimulus of the nationwide cancer research program, supported by private and public funds, has changed the picture in that field. Today, the major emphasis in cancer research is on basic problems—in genetics, biochemistry, biophysics, and other fundamental disciplines. It is no longer difficult to interest able investigators in these problems. There has been a steady growth in cancer research facilities and in the number of trained investigators. A great deal of new fundamental knowledge is flowing from the cancer research program. We should like to see the same stimulus and response occur in the field of blindness.

The paramount need in sight conservation is for a broad-scale basic research program, integrated with research in related fields. Such a program will be the starting point for an attack on the problem of blindness at its roots, in contrast with our present inadequate efforts to deal with the tragic end results.

The Public Health Service hopes to keep this emphasis on basic study and prevention foremost in our research program on blindness and neurological diseases.

## Prevention Basic

The ideal of prevention has always led the health agencies, both voluntary and official. But it has not been easy to convince large numbers of people that the preventive approach—the public health approach—is the best and the most economical. This is especially true in conditions such as blindness. Yet, besides the humane values, there are substantial economic savings in the preventive approach.

The National Society for the Prevention of Blindness has pointed out that in some industrial plants, sub-normal eyesight keeps 25 to 40 per cent of the workers below normal production. The National Society also estimates that industrial eye injuries result in costs upward of \$250,000,000 annually. Moreover, we can expect appreciable increases in the costs of services to the blind as more people in our aging population fall victim to eye diseases of the later years. Blinding diseases and visual defects among children also lay the foundation for an incalculable amount of disability and low productivity in the adult population of the future.

If the battle against blindness is to be carried forward to new victories, our state and local health services must be adequately equipped to help and extend the efforts of the voluntary agencies. Our nation is still far from the goal of complete coverage with local health units. The state health agencies, however, are stronger than ever before and many are taking an active interest in sight conservation.

The public health approach is that of case finding and follow-up. Vision testing of school children, for example, with follow-up of those who need

corrective care is one of the first steps toward the prevention of blindness.

### **Chronic Eye Diseases**

Case-finding programs to locate adults with chronic eye diseases such as glaucoma will bring many patients to treatment in the early stages of their disease, when blindness can be prevented. The National Society and several local associations have pioneered in glaucoma case finding, and the Public Health Service is proud to have cooperated in a small way with these voluntary agencies in some recent projects.

State and local industrial hygiene services also can contribute greatly to sight conservation. Besides cooperation with industrial safety programs, these health agencies can assist in case-finding activities and in programs for the improvement of lighting and other environmental conditions.

Congress has established or expanded Public Health Service programs in specific chronic diseases in recent years. The major emphasis in these programs is on research and training of technical personnel. We have recognized that the application of preventive measures for chronic disease control requires a great deal more emphasis and assistance than we can give at the present time.

In 1949, a Division of Chronic Disease was established in our Bureau of State Services to give technical aid to state and local agencies in the development of their programs. Recently, this division has been combined with the Division of Tuberculosis which had a well-developed program with a special appropriation.

Our Division of Chronic Disease and Tuberculosis is deeply interested in the prevention of blindness, although we have no funds to support special activities in that field. The Division, nevertheless, will do all in its power to encourage the states and communities to pursue case finding in diseases of the eye and defective vision. We shall encourage the development of programs which will emphasize primary and secondary prevention of blindness. Where primary prevention is not possible at the present time, the goal will be to arrest or stabilize disease at a point where vision can be preserved.

We are working closely with our sibling organizations in the Federal Security Agency—the Office of Vocational Rehabilitation, the Children's Bureau, and other units concerned with sight conservation and aid to the blind. For it is our firm conviction that only through close teamwork by the individuals and agencies concerned can the total burden be reduced.

### **Voluntary Agencies Essential**

The Public Health Service, however, must look to the voluntary agencies, such as the National Society for the Prevention of Blindness, for the major stimulus to greater public health effort in this field. Strange as it seems to you, to the associates in public health work whom you have converted, the prevention of blindness is still very much a pioneer effort. And, as in the past, the indispensable function of the voluntary agency is that of the pioneer.

It is a source of great satisfaction that the National Institute of Neu-

rological Diseases and Blindness, with its vigorous Advisory Council, is very much a going concern—albeit with a very limited budget: funds derived by the transfer of funds from other related programs. In short, we have had no “new money” as yet for this program, but approximately \$410,000 has been allocated this year in research grants to projects in such basic fields as neurophysiology and pharmacology, neuropathology and anatomy, as well as in studies of vision, neurosurgery, and related subjects.

When funds become available, we

hope to push forward on the whole research and training front in neurology and blindness. Our primary aim will be to increase the numbers of trained investigators and to expand basic investigations in these fields.

Finally, the Public Health Service looks forward to strengthening our partnership with the National Society for the Prevention of Blindness—a partnership which has existed for many years, but which now has taken concrete form and direction in the establishment of the National Institute of Neurological Diseases and Blindness.

### MEASURES\*

The eyes compass more than the mouth,  
So let them be kind;  
Cruel eyes, forbidding and cold,  
Were far better blind.

The eyes hold more than do hands  
With tentacle fingers;  
Touch, surfeited, loosens its hold;  
Unsated, sight lingers.

Yet a substance more fluid than eyes  
No measure can bind,  
No boundaries ever were marked  
For the scope of the mind.

—HARRIET GRAY BLACKWELL

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## Prevention of Blindness Through Voluntary Effort—A Panel Discussion \*

Chairman: Ira V. Hiscock, Sc.D.

Department of Public Health, Yale University, New Haven, Conn.

THE significance of teamwork, neighborliness, and—in the words of Chairman Hiscock—"working-together-ness" were stressed during this panel discussion.

THE discussion began with Mrs. Virginia S. Boyce, assistant director of the National Society, who said, in part:

Projects to be discussed this morning have worked out particularly well in several communities. We hope these projects will present ideas to others who are interested in broadening their prevention programs and perhaps will arouse interest in those who do not have prevention programs at the present time.

The National Society has watched these projects develop from the very beginning. We know what difficulties have arisen. During this discussion, you will see how these difficulties have been overcome.

\* Excerpts of discussions presented at the Annual Conference of the National Society for the Prevention of Blindness, March 29, 1951.

### Volunteers in Vision Testing in Grand Rapids

The panel's first speaker was Mrs. Charlotte-Ann B. Breed, executive secretary of the Grand Rapids Association for the Blind and for Sight Conservation. She said, in part:

Ten years ago, the agency which I represent changed its major focus to that of prevention of blindness, and the Board of Directors felt that the eye health of children was the natural starting place.

Ten years ago in Grand Rapids, there was absolutely no recognition of the fact that eye difficulties may precede school admission and that it is most important, both for the child's school adjustment and for the treatment of many conditions, for eye difficulties to be recognized before the child enters school.

The National Society gave guidance in the recruiting of volunteers

who were to be trained and supervised by us. These volunteers would do vision-screening tests in whatever setting seemed the most favorable in the community.

In 1941 there was an increasing interest in volunteer work all over the country, and that first year we trained in our sixteen-hour basic training course seven volunteers, and tested the vision of a total of less than 50 youngsters. We were pretty distressed over the amount of effort that the individual volunteers were willing to put into the project as related to the number of children reached, and very shortly thereafter changed our own emphasis to work with the Parent-Teachers' Association round-ups, or the P.T.A.'s in the various elementary schools, to encourage the development of round-up clinics and to fit ourselves into that program.

#### ***Tying in with P.T.A. Round-Ups***

After one year's effort in the development of round-up clinics, nine clinics were held and 284 children tested, so that we were pretty sure we were on the right track.

From the very beginning we had set up very definite standards and were under the continuous supervision of a staff of three consulting ophthalmologists. Those standards included the passing of a pretty rigid examination as a prerequisite to do the testing. People who had taken the one-year basic course had to come back for a two-hour refresher course before they could do vision testing again.

In 1947 over 30 round-up clinics were held, and almost a thousand children were tested. We had 30

volunteers to do the work and a staff member tried to be present at every round-up clinic.

The volunteers were disturbed because so much time was being put into the project. We saw that we had proved the importance of preschool vision testing and that it would be necessary for us to change our plans radically if we were going to be able to answer the need.

Again with National Society guidance, we did change the entire organization. We set up as many safeguards as we possibly could to maintain standards we felt were absolutely essential because of volunteers working in the project, and we moved forward. We asked each individual P.T.A. to recruit its own vision testers from its membership. We assumed responsibility for their training, for providing them with the testing equipment, and for supervising. We did not have sufficient staff to act as supervisors and we gave the more experienced volunteers additional training for that purpose.

As far as the clinics went, we very shortly realized that the examining physician in the P.T.A. clinic was obtaining the vision-testing report in only a very small group of cases. Vision testing moves slowly. If the children were having their vision tested on the same morning that the doctor was there, those children seen in the last hour of the clinic were fatigued to the point that accurate testing was impossible. We therefore made a concerted effort to have the P.T.A.'s separate the round-up, and to have weighing, measuring, and vision testing take place some time ahead of the general physical examination.

We also tightened up the follow-up system, feeling that we needed to know even more definitely the accuracy and results of the testing, and what was happening to the increasing number of children being found to need eye examination.

### ***Screening for Cross-Eyes***

As to the tests we used, at the beginning our ophthalmologists recommended the Snellen E chart together with a close observation of the child in the clinic situation and a carefully taken history of behavior symptoms from the mother. This was satisfactory except that there were many youngsters in the seven-to-ten-year-old group who were coming in for examinations for cross-eyes for the first time. That proved that we had failed to screen those children who needed treatment for muscle imbalance at a sufficiently early age. To catch these cases at a younger age, we tried a number of tests and finally decided on the Worth 4 dot near-point fusion test as being the most simple to administer (and that always has to be taken into consideration when you are working with the volunteers). This test also has the advantage of intriguing the four-and-a-half-year-old child, and it is one he can do whether he knows color or not. We are not too satisfied with the results of using this test. Possibly the faults lay in the administration. We have therefore placed particular emphasis on administration in the training courses for volunteers these past two years, and have had more favorable results. We think that it under-screens, however, and that is, of course, a disadvantage.

More than 200 P.T.A. women are taking part in the project this year, of which approximately a hundred are experienced testers. Many have had two or three years' experience. We had more than 80 in the past three years in our basic courses, and we have about 35 supervisors.

Beginning in 1941 with fewer than 50 youngsters tested, we anticipate testing around 2,000 this year.

### ***Glaucoma Case Finding in Philadelphia***

Next, Miss Evelyn M. Carpenter, director of the Philadelphia Committee for the Prevention of Blindness, discussed glaucoma case finding:

Our glaucoma case-finding project stemmed from a follow-up service in eleven eye clinics to establish a closer relationship between persons with glaucoma and the clinic where continuous and adequate treatment was available.

Our experience with this group indicated the need to reach glaucoma patients earlier if blindness was to be held back. We were face to face with a case-finding job and without a pattern to guide us. Mass screening seemed to be the only solution to the problem and it would be costly. With our limited budget the process would have to be painfully slow—and it was—but that is past history.

### ***Ten Thousand Screened in Two Years***

Two years ago, you will remember, at the 1949 Annual Conference we gave the first report of the experiment. It was based on screening 3,923 persons and following through

to diagnosis. Nearly 2 per cent were found to have definite, early or borderline glaucoma. Today we can report on 10,000 persons, forty years and older, examined in industrial plants, stores, banks, insurance companies, Public Assistance offices, federal offices. Approximately 10 per cent were rechecked for increased ocular pressure and, of that group, some 250 were referred for a complete diagnostic service.

Diagnoses of definite, early and borderline glaucoma were made on 226—2.26 per cent of the total number. All have been referred for treatment, and we continue a follow-up service to stimulate regular reporting to clinics and ophthalmologists.

We hope that results of the case-finding service may so impress heads of industry that a similar service may become a part of the general physical examination and health programs which are in operation in many plants.

We are especially hopeful, since two industries have indicated their desire to pay for a glaucoma service, that others may follow and so enable the Philadelphia Committee for Prevention of Blindness to study a wider variety of industries in relation to the eye health of their employees.

It is good to be able to say to a plant executive, "We found two per cent of your employees to have glaucoma and they are under treatment, but as of today they become more valuable to you, more constantly useful to their families and their community because they have a sight expectancy for life—rather than a certainty of blindness." After all, that is what we are working for.

## **Industrial Vision Program for Small Plants in Maryland**

The next speaker was Mr. Robert J. O'Shea, director of industrial service for the Maryland Society for the Prevention of Blindness, who outlined the industrial vision programs for small plants in the Baltimore area, set up by the Maryland Society. Said Mr. O'Shea:

Industries need help in sight conservation and they have a right to expect it from the voluntary agencies in their area. One of the ways that industry needs help is in education—of the employer as well as of the employee. Industry needs help in the use of the screening devices. They also need help in increasing the effectiveness of their eye protection program. In all too many cases, they need assistance in starting such an eye protection program.

But let's look in particular at small industries with fewer than 400 employees. In the aggregate, small industries employ 60 or 70 per cent of the workers in this country.

These small industries do not have money or personnel departments, and many of them exist more or less on a hand-to-mouth basis.

About two years ago the Maryland Society for the Prevention of Blindness engaged in an experimental and unusual type of program to give these small industries the same sort of sight-conservation service that the large, progressive plants in the country have lately been providing for their employees. We operated for these small plants in the Baltimore area as a large plant would treat

each one of its departments. We have gone into the plants, done the vision testing of each employee, done the job survey, screened those employees who did not meet the minimum vision requirements of the job, notified the employee, and advised him to seek professional care.

### ***Working Conditions Important***

We have gone further than that, and paid attention to the seeing and working conditions under which the employee must operate. We do a lighting and safety survey of the plant, with particular attention to any possible eye hazards and how they can be removed. We have found that this is one way in which employees in small plants can be helped.

Once this program is well outlined, perhaps the most important step of all must be taken. The cooperation of the professional men in the area must be obtained, working through the ophthalmological section of the local, county, or state medical societies and through the state optometric society.

We are fortunate in Baltimore in obtaining 24 ophthalmologists and 23 optometrists, all approved by their respective professional associations. We have had nothing but the best of cooperation from the ophthalmologists and the optometrists, and it has helped to steer the referred employees away from commercial organizations and practitioners.

To insure management's interest in the operation and success of the service, management should pay a fee for it. The fees that the Maryland

Society obtained ranged from \$50 a year for a plant of 25 employees up to \$500 for a plant of a maximum of 400. These fees obviously are token fees and do not pay for the service that management receives.

If the program is designed or planned to be self-sufficient . . . that depending upon the general level of sight-conservation activity in the area, a period of no less than three and probably around five years will be required before . . . the fees obtained from the plants would defray the complete cost of operation of the program. In an area where there is relatively little industrial sight-conservation work, where there are very few organized vision- or sight-testing programs, more than five years may be needed because the educational job must be done first, both with the employers and the employees.

### ***Labor Cooperates***

We have received the cooperation of organized labor, but it has been 10 per cent active and 90 per cent passive. The active part was to notify all locals in the Pennsylvania-Maryland-Washington area about the program and request them to forward any information or questions about their own plants to the Maryland Society. The passive aspect has been cooperation from the labor unions so that if any shop steward has any question about the program we can refer him to the top men in his organization, CIO or AFL. We can point out that organized labor has been in from the planning stage on, and that the program is in labor's favor.

## Use of Volunteers in D. C. Society

The effective use of volunteer workers in local agencies was described by Miss Helen Curtis Demary, executive director of the District of Columbia Society for the Prevention of Blindness, who pointed out that "all of the voluntary agencies are working with a very small staff and very limited budget." She said further:

We all see projects we should like to carry out and just cannot do them with the means at hand. One way of solving this problem, partly, at least, is by the wise use of volunteers. We have tried volunteers on a number of projects at the District of Columbia Society for the Prevention of Blindness, most of which were rather successful.

Clerical work is service in which the use of volunteers is not generally considered successful, but we have had some luck in getting volunteers to work on special projects during peak loads, during vacations, and on special jobs. For instance, in revising our mailing list, we have had volunteers do home telephoning, each taking a hundred cards, and gradually we have got through a list of 2,000.

Another successful volunteer project has been in vision testing. At one time our Society trained 40 volunteers and tested about 9,000 children in the parochial schools where no vision testing was being done. At present we are using Junior League members in preschool vision testing. Some of them are so well trained they can do the testing without close supervision.

Volunteers can help an agency

greatly in its publicity. The picture of a boy shot in the eye by a BB gun is the most graphic warning to others. Personal testimony is often useful. One 48-year-old woman who had been cross-eyed since early childhood saw our exhibit on cross-eyes and asked (though the exhibit concerned children) whether something could be done for her. As a result of information we gave her she had her eyes straightened. When we wanted to have someone tell about the agency's work at a Community Chest luncheon, she very willingly got up before 300 people and told a thrilling story, in spite of the fact that formerly she had been over-sensitive and shy. Her talk helped greatly to dramatize the agency's work.

## Professional Liaison Helps Prevention in Illinois

Mrs. Ben Humphries Gray, executive secretary of the Illinois Society for the Prevention of Blindness, told the meeting how her agency had brought Illinois oculists and optometrists together to set up a standard vision-screening program for school children. She recalled:

The Illinois Society for the Prevention of Blindness has a long history in visual screening programs. Back in the days of the depression with the man power of WPA the Society was instrumental in screening the eyes of more than 1,500,000 children throughout the entire state, in a five-year period. That was the first real effort in Illinois to create an interest in visual screening programs in schools and to demonstrate that there was a need for them.



As staff and school and health departments changed, the interest and knowledge of how to carry out a screening program did not remain constant. Our office was flooded from time to time with questions about other screening methods, how to improve the screening program, and what to do with referrals.

### ***Need for Professional Harmony***

In recent years there has been an increase in requests for help in making visual screening programs more effective and more generally accepted. The Society found that if the visual screening program was initiated by the school, the professional groups were not quite satisfied with it. If professional groups were interested in it, it became either a medical program or an optometric program, rather than a program backed by the community as a whole.

The Society observed that 50 per cent of the children who were picked up by screening programs were seeking eye care from the optometrists. In view of the fact that studies show that pathology exists in about thirty per cent of all cases seeking eye care, the Society came to the conclusion that both ophthalmology and optometry must have a place in the total program if a visual screening program was to be truly effective.

### ***Committee Formed***

Mrs. Gray went on to tell how ophthalmological and optometric groups finally agreed to serve on a joint committee formed by the Society—two from each professional group, with a layman serving as chairman. This joint committee drafted a visual screening program which subsequently was approved by the Illinois State Medical Society, the Chicago Ophthalmological Society, the Chicago Pediatric Society and the Illinois Optometric Association. She concluded:

Today the efforts of the Society are being directed toward establishing joint professional committees throughout the state which can be used for professional guidance in the area and by the schools interested in setting up these programs. The approval of county medical societies is sought before working in the various counties.

The state-wide joint committee recognized that on referrals from optometrists to ophthalmologists in specified cases, it was extremely important to have good interprofessional relationships. On those cases referred by the optometrist to the ophthalmologist it was agreed that the medical eye specialist had a responsibility to send a pertinent report to the referring optometrist and to refer the cases back for whatever optometric care was necessary.



## Civic Group Activities for Prevention of Blindness—A Panel Discussion \*

Chairman: Franklin M. Foote, M.D., Executive Director

National Society for the Prevention of Blindness, New York, N. Y.

SO that others may "go and do likewise," the activities of local and national civic groups carrying on sight-conservation programs were presented.

**D**R. FOOTE pointed out in introducing the subject under discussion that though there are many civic groups, it would be possible to hear from only a few.

### Parent-Teachers' Associations

Mrs. C. Meredith Springer, director of the Long Island District of the New York State Congress of Parents and Teachers, reported on cooperation:

Our organization, of course, is interested in the welfare of all phases of children everywhere. We are interested in the mental, spiritual and physical activity of the child. So far as our concern with sight conservation goes, we try to mold public opinion so that there is an opportunity for every child to have a public education whether he may see well or whether he is a handicapped child.

\* Excerpts of discussions presented at the Annual Conference of the National Society for the Prevention of Blindness, March 29, 1951.

### The Partially Seeing Child

Mrs. Helen W. Fields, a New York City sight-conservation class teacher, discussed the program for the visually handicapped in the New York public schools, indicating that there are 102 sight-conservation classes in New York City elementary and junior high schools. She said:

The purpose of these classes is to prevent failure in the regular grades, and the consequent emotional disturbances that go with failure; to relieve eye fatigue; and, if possible, to improve the vision of these children.

Recommendation for this special educational placement is subject to the approval of the supervising ophthalmologist of the Department of Health. Placement is restricted to children who have poor vision, after correction, of 20/70 or worse in the better eye, or 20/50 or worse in both eyes. At these levels of vision, regular textbook print and even front-row

seats will not compensate, and school work as well as the social and emotional development of the child suffers.

If there is any chance of improving the sight in the amblyopic eye of a child who does have that condition, he is placed in a sight-conservation class. There the specially trained teacher cooperates with the clinic and private doctors to make sure that the pupil wears his patch, and his weak eye is stimulated to use.

Another group which benefits by sight-conservation placement, and by far the largest group, is the group of children with myopia over four diopters. In this city many believe that the special facilities of sight-conservation classes may help to prevent myopic progression or complication.

Continuous growth, mentally, physically, socially, emotionally, is on the same basis for sight-conservation children as for those without visual difficulty. The pupil is not isolated; rather he is integrated into the program of a public school. A sight-conservation pupil is assigned to a regular grade. He has two teachers, a regular grade teacher and a sight-conservation teacher in the sight-conservation classroom. The pupil goes there for reading from enlarged print in preparation for work in the regular grade; for using special equipment, such as large globes without details, bulletin typewriters, furniture and lighting especially designed for better seeing; and for eye-rest periods as well as an active eye-hygiene program, which will stimulate him to use his mental powers with materials that require a minimum of eyestrain.

## Lions Clubs

The work of the Lions Clubs in sight conservation was outlined by Mr. Ernest R. Fryxell, of the New York Lions Club. Mr. Fryxell reported on the activity of Lions Clubs from 1949 to 1950:

The individual clubs which have reported have completed about 116,276 eye cases, on whom about \$12,000,000 were spent.

That, of course, takes in anything from sponsoring eye clinics in different parts of the United States to bringing children under medical care by providing transportation.

So far as the Lions Club of New York is concerned, five years ago the Board of Directors initiated the giving of scholarships to the medical graduate students of New York University College of Medicine. At that time four scholarships were given—all that were needed. Each scholarship was for \$500, which of course helped the medical graduate student in his basic training in ophthalmology. Since the program started, 20 scholarships have been given. Now we are thinking about adding research as an activity worth supporting. In fact we have been consulting with various ophthalmologists, and our Board of Directors is considering the selection of some university or a large medical center here, for the purpose of giving a research fellowship of perhaps \$5,000 a year.

Dr. Parker Hoffman, of Corning, New York, told briefly of the work of the Lions, Kiwanis and Women's Clubs in his community:

There is a great need in many small communities for personnel, for in-

stance, in orthoptic work, to screen school children properly, and for proper follow-up care of visually handicapped, and some of the Lions Club's activities are directed toward meeting that need. The Lions Club has organized the Buffalo Eye Bank and Research Foundation, and our hospitals in Steuben County are cooperating with this organization in obtaining eyes, where possible, suitable either for corneal transplant or for pathological study. This Foundation also makes funds available through the local Lions Club for eye surgery necessary for preservation of sight, where the patient or his family cannot pay his way or has not received county or state aid.

Dr. Harold J. Wolff, an optometrist from Nutley, N. J., reported on the vision-screening work of the Nutley Lions Club:

We have provided a vision-screening service to our schools, consisting of a high school, a junior high school, four grade schools, and two parochial schools. Annually, in October, we screen the children in the third grade. They say that children spend three years learning to read, and after that they read to learn. Therefore, it is advantageous to provide screening for these pupils at least, at this time. Incidentally, different members of the Lions Club have been trained to assist in the screening program, and work with the medical department—especially the nurses. After the screening, the pupils are followed up with proper notices. The Lions Club provides for the indigent cases found in need of eye care. In addition, the Lions Club takes care of others besides

children, by providing financial aid in cataract cases and, of course, in replacing glass eyes, too.

### **Delta Gamma Fraternity**

Mrs. Carl Z. Draves, chairman of the Long Island North Shore Alumnae Chapter of Delta Gamma Fraternity, reporting on the nationwide sight-conservation work of the fraternity, said:

The national project of Delta Gamma Fraternity is sight conservation and aid to the blind. It is our goal to have, by 1952, a 100 per cent participation in some way by every active and alumnae chapter of Delta Gamma. The project of the Long Island North Shore Alumnae Chapter is the visual screening of preschool children. Twelve of our group have been trained and qualified for this work by the New York State Commission for the Blind, and have been endorsed by the Nassau County Medical Society. Our purpose is to detect any tendency that the child may have toward abnormal visual acuity or abnormal muscle balance and to recommend that he be referred to his family physician for follow-up.

The total number of children screened from March 1, 1950 to March 1, 1951 was 439. There is no recording for 39 of them, as they were uncooperative or too young. Therefore the report is actually for 400. Of these, 322 were found to be normal in every respect; 78 showed some irregularity. Of these, 65 were referred to their family physicians, and the remaining 13 we suggested watching. Of the 65 referred to the family physician, 30 showed ab-

normal visual acuity; 15, abnormal muscle balance or pupillary reaction; 10, both irregularities; and 10 were referred for other reasons, such as granulated eyelids, decided squint, or straining. The 13 we suggested watching showed very slight straining during the screening, or squints which might well be mannerisms.

Another activity of Delta Gamma concerns Project Scholarships. We are offering scholarships to train personnel for special work with the partially seeing and preschool blind children. Our Scholarship Project Fund consists of a \$1,500 annual fund and a \$2,000 revolving loan fund, from which smaller scholarship awards are available to those intending to become (1) orthoptic technicians, (2) teachers for partially seeing children, or (3) specialists for blind preschool children.

### **New Eyes for the Needy**

Mrs. Franklin B. Satterthwaite, chairman of New Eyes for the Needy, of Short Hills, N. J., described the work of her organization:

New Eyes for the Needy was started by Mrs. Arthur Terry in 1933, and is run completely by women volunteers. Mrs. Terry was working in New York with the Red Cross, giving out food coupons to those who needed them during the height of the depression, and she found that many people could not see to sign their names. She would say to these people, "Where are your eyeglasses?"

And they would say, "Well, if we had enough money to buy eyeglasses, we would have them. We don't have enough money to buy food."

Disturbed by this state of affairs Mrs. Terry asked her friends in Short Hills for their discarded eyeglasses. They all brought them out, and she put them in a box.

She realized that prescription glasses are necessary, and one day as she looked in the little box and saw the gleam of gold, she thought, "If I can only get more glasses and more gold frames, and sell them to a refiner, I will have some money, and with that money I can provide prescription glasses," and thus New Eyes for the Needy was born.

Mrs. Terry was a very wonderful person and knew many influential persons, including the late Alexander Woolcott, who let her speak on the radio about this work, and the glasses began to pour in to Short Hills from all over the country.

In 1947, when Mrs. Terry became quite ill, she was not able to carry on the work of New Eyes for the Needy, and the project was incorporated by the Short Hills Junior Service League.

The mail still comes in large quantities. Last week we had 9 bags, and a few weeks before that we had 16 bags. These bags weigh about 65 pounds each. The glasses are sorted. The metal is put in one box, the plastic in another, the sunglasses in another. The metal is sold to a refinery. That gives us our funds. We never ask for money.

Last year we gave out over 5,000 pairs of glasses. This year we should like to give out over 10,000 pairs of glasses. We want that number to keep growing, and it is only through the cooperation of people all over the country, and the way they help us, that we can continue our work.

## Note and Comment

### *Silver Nitrate Favored*

The National Society for the Prevention of Blindness went on record as favoring continued use of 1 per cent silver nitrate solution as the preferred prophylactic agent in preventive treatment of ophthalmia neonatorum, a disease formerly causing more than one fourth of all blindness among American children. This action was taken by 25 medical consultants of the National Society at a meeting in Atlantic City in conjunction with the recent sessions of the American Medical Association.

Although there has been considerable research in the past few years on the use of penicillin rather than silver nitrate for this purpose, the medical advisory group felt that additional scientific research is needed before penicillin or other antibiotics can be accepted as a safe and adequate substitute.

Reporting the action of the medical advisory group, Franklin M. Foote, M.D., executive director of the National Society, said:

"The committee considered research which has been carried on at the Johns Hopkins Hospital, Cornell University Medical College, University of Iowa, Ohio State University, and in Trenton, N. J.

"It was felt that additional scientific research should be carried on in well supervised training centers to explore further the effectiveness of various antibiotics, the question of sensitivity, and the possibility that strains of some bacteria may de-

velop a resistance to certain of the antibiotics.

"In the prevention of blindness from ophthalmia neonatorum, emphasis should also be placed on medical care of expectant mothers, and any infection found in the genital tract should be treated."

The medical advisory group also discussed questions concerning eye research, glaucoma, and education of the partially seeing child.

### *AMA Endorses National Society*

On June 13, 1951, at its meeting in Atlantic City, the American Medical Association formally voted to approve the National Society's program for the promotion of research, education and preventive service.

### *Science Wins Again*

With the passage on April 30 of a municipal pound ordinance which provides that stray impounded animals may be turned over to approved medical laboratories for research, Buffalo became the first city in New York State to effect such legislation.

Thirty-one other cities in the United States have enacted similar measures, and four states—Minnesota, Wisconsin, South Dakota and Oklahoma—have state laws governing that unclaimed impounded animals are turned over to medical institutions. Illinois and Pennsylvania are now considering legislation of this nature.

Under the Buffalo ordinance, approved laboratories are now able to purchase dogs from the municipal

pound for the license fee of two dollars. Cats may be procured from the pound without cost. The city officials state that the matter now becomes a closed issue as far as the City Council is concerned, and that local antivivisection groups which have fought the ordinance have no further recourse.

### ***Lighting Research Projects***

In the past six years, the I.E.S. has invested more than \$65,000 in research contracts on problems related to illumination. Prominent among these are:

A new visibility meter for easier evaluation of tasks in the field, which has been developed at Cornell University.

A practical study of the effect of brightness ratios, which has been completed at Southern Methodist University. Results confirm the I.E.S.'s emphasis on low brightness ratios as a key to maximum visual performance and comfort.

A model room for study of the control of daylight through horizontal and vertical louvers has been erected at the University of Michigan. Readings are being taken, both on light from a simulated sky and from a simulated sun.

Most of the experimental data has been taken at Brooklyn College on the effect of the color of the light source on the appearance of colors used in interiors.

### ***Health Interest of College Students***

The April 1951 issue of the *Junior College Journal* contains a lead article entitled, "An Analysis of Health Interests of 1000 Junior College Students in California." Using the Byrd Health Interest Inventory, Dr. Joseph Lantagne studied the health topics pre-

ferred by 500 boys and 500 girls in Pasadena City College and Ventura Junior College. There were 300 different possible choices included in the inventory and these were arranged in rank order in accordance with the percentage of students who expressed great interest in them.

The topic listed as "Lifelong Care of the Eyes," was ranked in *second* place by both the boys and the girls. Boys granted first place to "sex instruction" and girls placed "causes of mental illness" at the top of their list.

Textbook authors, teachers, and prevention of blindness workers should seize every opportunity to capitalize on the natural interests of students in this age group.

### ***Physician Receives Prize***

Professor René Sand, Brussels, Belgium, a great physician whose entire career has been devoted to public health and social welfare, was honored by the World Health Assembly. On May 7, 1951, in Geneva, Switzerland, Dr. Sand received the Leon Bernard Prize, created by international subscription in memory of Professor Leon Bernard of France, and given for practical achievement in social medicine. The last time the prize was awarded was in 1939.

### ***I.E.S. to Hold Technical Conference***

The National Technical Conference of the Illuminating Engineering Society will be held in Washington, D. C., August 27-30, 1951. Among the papers thus far scheduled for presentation are the following: "The Cost of Seeing a Critical Industrial Task"; "Maintenance of Industrial Lighting"; "The Evaluation of Visual Comfort Data"; "An Analysis of Fluorescent



Luminaire Brightness"; "Light, Color and Environment in Offices."

### ***Color-Blind Hunters Upheld***

Answering a physician's query regarding the rights of the color-blind to go hunting, the *Journal of the A.M.A.* replies in the May 26 issue:

"To refuse hunting licenses to color-blind persons would be an undeserved discrimination. There is no color or combination of colors that will do more than call attention by contrast when visibility and visual acuity permit. Color-blind persons distinguish difference in contrast and brightness that suffices for their lack of ability to name color and adequately answers their need for general living conditions.

"The custom of using red as identification by a hunter has become well established in the minds of the people, as is the use of white canes by blind persons. The same identification could be established about any color that gives equal contrast with the usual surroundings. No color worn by a hunter will be more readily discerned or more quickly interpreted by the vast majority of hunters than the accustomed red. After all, the flag of identification must be set up for all hunters, irrespective of their color vision.

"The color-blind among hunters are no greater in proportion than in civil life. Their record of safety in traffic is no worse than the record of those who are not color-blind. Factors other than inability to recognize the red cap of a hunter and the white tail of a deer are more responsible for unfortunate hunting accidents."

### ***Predicting Interior Daylighting***

Extensive work at the Pittsburgh Corning Daylighting Research Center has resulted in the development of a nomograph or chart which makes it possible to predict daylighting levels in a room before the building is constructed.

While previously it has been possible only to guess at the performance of the fenestration, it is now possible to predict accurately the amount of daylight which will be present at any point in a room, and at any time of day and day of the year. The effects of building orientation and geographical location, fenestration area, sun altitude and azimuth, clouds, are all accounted for.

The use of the Daylighting Nomograph will be particularly valuable in designing schools, offices, factories and other buildings where the occupants will be performing tasks which require a comfortable environment for efficient critical seeing.

### ***Educator Honored***

At a meeting of the National Society's Industrial Advisory Committee on June 1, the following resolution was unanimously adopted, honoring Dr. John L. Hopkins, Superintendent of Schools, Hastings-on-Hudson:

WHEREAS, Dr. John L. Hopkins, Superintendent of Schools, Hastings-on-Hudson, New York, is retiring after a long and distinguished career, and

WHEREAS, under his leadership, a complete shop program for eye health and protection was established at Hastings High School, the first of its kind in the United States, therefore be it



*Resolved*, that Dr. Hopkins be congratulated on this notable contribution to the cause of sight conservation, and be presented with an official expression of appreciation by the National Society for the Prevention of Blindness.

On June 15, 1951 at a testimonial dinner in Hastings, Mr. Spencer B. Hopping, on behalf of the National Society, presented Dr. Hopkins with a Certificate of Appreciation.

### ***Conference on Occupational Vision***

On November 1 and 2, 1951, Rutgers University will hold a conference on occupational vision under the general heading of "Eyes for Defense." The National Society as well as a number of other agencies will take part. Among the sponsoring associations are the American Society of Safety Engineers, the Illuminating Engineering Society, the National Society for the Prevention of Blindness, and nine New Jersey official and professional agencies, including medical, optometric, nursing, engineering and safety groups. Requests for further information should be addressed to: Maurice A. Chaffee, Director, University Extension Division, Rutgers University, New Brunswick, N. J.

### ***Grace Harper Retires***

Miss Grace S. Harper, director of the Commission for the Blind, New York State Department of Social Welfare, retired on May 31, after more than 31 years of distinguished service with the state. She is known throughout the United States, Canada, and Europe for her rehabilitation work and especially for her pioneering activities in the field of the blind. With the cooperation of the members of the State Commission for the Blind, con-

sisting of five citizens appointed by the Governor, Miss Harper has developed a system of services for the blind in the last three decades which has earned broad recognition. Among these services were prevention of blindness activities and studies of the causes and means of prevention of blindness.

Miss Ruth B. McCoy, assistant director of the Commission for the Blind of the State Department of Social Welfare, has been appointed acting director of the Commission pending a civil service examination to fill the post permanently.

The achievements of both Miss Harper and Miss McCoy are well known to readers of the REVIEW, who will join the National Society in extending heartfelt good wishes to Miss Harper on the well-earned leisure which lies ahead and congratulations to Miss McCoy, whose years of devoted service in the Commission will stand her in good stead as acting director.

### ***Educators Cooperate***

During the past year the National Society for the Prevention of Blindness initiated a long-range study of causes of defective vision among children in all schools having facilities for meeting the needs of partially seeing children. The response received thus far from teachers and supervisors working directly with these children has been exceptional in terms of both accuracy of reporting and promptness in reply. The Society wishes to express its sincere appreciation for the generous cooperation of teachers, supervisors, ophthalmologists, and others who contribute the information which makes possible national studies of this kind.

## Current Articles of Interest

***The Care of Premature Infants on the University Service, Grace-New Haven Community Hospital***, R. E. Cooke and G. F. Powers, *The Yale Journal of Biology and Medicine*, February, 1951, Vol. 23, No. 4, pp. 282-287.

Research at Yale University School of Medicine included giving premature infants vitamin E in 50 mg. doses three times daily as experimental prophylaxis for retrolental fibroplasia. This has not prevented the development of the disease. A careful, systematic study of the eyes of all prematures is made, including ophthalmoscopic examination for early evidence of retrolental fibroplasia. After discharge from the hospital examinations are made every two weeks until the infant is about four months of age. In this way information about retrolental fibroplasia is being obtained which may be useful in an experimental approach to the etiology of the disease.

***Retrolental Fibroplasia***, J. Minton and P. Cole, *British Medical Journal*, Saturday, March 3, 1951, No. 4704, pp. 450-453.

Is the disease prenatal in origin or is it postnatal? Posing this question, the authors present the opinions of a number of observers. Some suggest that the disease is only one manifestation of a generalized maldevelopment of the vascular and nervous tissues in

antenatal life. Others suggest that vitamin E deficiency with excess of vitamin A in the food of the premature infant is the cause of the onset of the disease. Statistics on the incidence of the disease based on both American and British investigations are presented, and two case histories are included. In conclusion, the authors state that it is most probable that this eye disease is caused by some noxious agents during the intrauterine life of the fetus.

***Blindness in Premature Infants, With Special Reference to Retrolental Fibroplasia***, A. C. Krause, *Texas Reports on Biology and Medicine*, Spring, 1951, Vol. 9, No. 1, pp. 46-58.

Although the true incidence of retrolental fibroplasia is not known, it is known that it is increasing. Correlation of statistics in Chicago Lying-in Hospital for 1937 to 1950 shows that the total births, premature and previable births have increased only 50 per cent. Further, the annual number of survivals with a birth weight of less than 1,600 gm. falls in a relatively narrow range and is not increasing. It is in this group of prematures that the incidence of retrolental fibroplasia is growing, which indicates that the prevailing opinion that life is saved at the cost of sight is not true. However, the disease is related to prematurity. If the birth weights of infants with the disease are placed in groups with

250 gm. increments, the large groups are in the range of 1,000 to 1,750 gm., the largest in the 1,200 to 1,400 gm. weights.

**Retinal Micro-Aneurysms in the Non-Diabetic Subject**, N. Ashton, *British Journal of Ophthalmology*, April, 1951, Vol. XXXV, No. 4, pp. 189-212.

The retinæ of 336 eyes from 250 non-diabetic subjects were examined to ascertain the incidence of retinal micro-aneurysms in conditions other than diabetes. Methods and results are presented which show that capillary aneurysm formation in the retina occurs frequently. The author believes that, apart from vascular sclerosis, the occasional capillary micro-aneurysm is the commonest pathological lesion in the retina.

**The Ocular Complications of Arthritis**, D. Vail, *Southern Medical Journal*, April, 1951, Vol. 44, No. 4, pp. 317-322.

1. Lesions of the eye associated with arthritis tend to localize in the collagen tissues of the eyeball. These are: uveal tract, sclera, and Tenon's capsule, and the tendons of the extra-ocular muscles.

2. The characteristic remissions and exacerbations of the acute inflammatory ocular disease are highly suggestive of an allerge-toxic reaction and would indicate sensitivity of the ocular tissues to the underlying bacterial or other toxins present, which are responsible for the joint diseases.

3. The classification of the various forms of arthritis by the rheumatologist and the classification of the two forms of uveitis have been of the utmost value in clarifying our ideas. The nongranulomatous form of uveitis is

characteristically associated with arthritic disease.

4. Evidence is accumulating that ACTH and cortisone act as they do, by blocking this inflammatory response of collagen tissue to noxious elements.

5. An effort is made to link the various ocular lesions with the types of arthritis that may be present.

**The Ocular Manifestations of the Diffuse Collagen Diseases**, R. W. Hollenhorst and J. W. Henderson, *The American Journal of the Medical Sciences*, February, 1951, Vol. 221, No. 2, pp. 211-222.

The diseases that affect primarily the connective and vascular tissues have been designated as the diffuse collagen diseases. Since these diseases have such frequent ocular manifestations, the authors decided to contrast and compare them. They point out, however, that in considering them together they do not imply that these diseases are on the same etiologic basis or even related, except in so far as their manifestations stem from a common site of involvement, the connective tissue. A table is included which summarizes the ocular manifestations of the collagen diseases. The beneficial effects of treatment of many of these diseases with ACTH and cortisone have made the frequent evaluation of the ocular status of increased interest. The authors suggest that complete ocular examination should be carried out on all patients suspected of having one of the collagen diseases and that it should be repeated frequently in all proved cases during therapy.

**Pathology of Eye in Old Age, Changes Attributed to the Aging Process**, A. L. Kornzweig, *Transactions, American Academy of Ophthalmology*

and Otolaryngology, January-February, 1951, pp. 261-276.

A unique clinical and pathologic correlation of eye conditions in the aged has been made possible by an investigation conducted at the Home for Aged and Infirm Hebrews of New York City. The pathologic changes in the eyes of the residents were studied. Most of the patients were examined and treated during their stay at the Home, and many were examined repeatedly over a period of years. After death, the eyes were examined pathologically. Over a period of six years, 125 eyes from 92 persons were sectioned and studied. The age range of the residents was from 60 to 94 years. Over 70 per cent of those examined for visual acuity had good to adequate vision. The author indicates that, on the whole, the eye of the human being appears to stand up fairly well under the pressure of time, in spite of the enormous amount of strain to which it is subjected over the average lifetime. He lists and classifies, according to frequency of occurrence, the findings concerning the eye changes attributed to the aging process. The pathogenesis and bearing upon clinical changes in the eye are discussed, and reports by other authors are mentioned.

**The Watering Eye**, B. W. Rycroft, *British Medical Journal*, Saturday, March 17, 1951, No. 4706, pp. 577-580.

It is no longer necessary for patients to endure "that long drip of human tears," says Dr. Rycroft, since most cases can be cured by surgery. His discussion of the watering eye includes a description of the lacrimal apparatus; steps to be followed in the examination of the eye; hypersecretion of

tears; and deficient drainage of tears. He indicates that excessive watering of one eye is due either to hypersecretion of tears or to deficient drainage of tears. The former is usually due to one of the following causes: corneal abrasion, foreign body, corneal ulcer, aberrant lash, or bilateral epiphora. The latter may be caused by eversion and/or stenosis of the inferior lacrimal punctum or main naso-lacrimal block. Treatment for each of these conditions is presented.

**Experimental Nystagmus**, R. C. Browne, *The Lancet*, Saturday, March 31, 1951, Vol. CCLX, No. 6657, pp. 721-722.

Three black kittens and three tabbies were placed in a completely dark room and observed weekly with an ophthalmoscope. Four of the six kittens developed rotary nystagmus after being kept in the dark for 4 to 7 weeks. Three of the four recovered after being in daylight for a week. Since a cat's eye is similar to a man's, these findings suggest that coalminers' nystagmus may be a type of disuse atrophy of the visual apparatus. This is important in view of the fact that both doctors and pit managers tend to regard miners with nystagmus as "neurotic." The psychological symptoms may be the result rather than the cause of the disability.

**Some Ophthalmic Aspects of War Pathology**, G. Bietti, *American Journal of Ophthalmology*, March, 1951, Vol. 34, No. 3, pp. 382-387.

Conditions in war and postwar periods may cause, among civilians as well as military personnel, the following types of eye disorders: (1) eye diseases resulting from dietary deficiency

cies; (2) those of a toxic origin, usually caused by unsuitable food substitutes or tainted food; (3) infectious eye diseases which appear or spread more easily in wartime; (4) ocular disturbances with a psychic or nervous background; and (5) eye changes caused by unusual climatic or meteorologic conditions.

**Brightness Perception and Binocular Adaptation**, M. Pugh, *British Journal of Ophthalmology*, March, 1951, Vol. XXXV, No. 3, pp. 134-142.

An investigation was made for light adaptability and for suppression in 100 patients selected for their reliability in observation. They included cases of heterophoria with no history of amblyopia; cases of heterophoria in which one eye had been amblyopic but after treatment had recovered normal visual acuity (with glasses if necessary); and cases of heterophoria in which one eye was still amblyopic, the visual acuity of this eye being less than the normal visual acuity of the dominant eye. The author concludes, on the basis of findings: (1) a patient having normal visual acuity in both eyes can have a diminished sense of brightness in one eye; (2) a marked loss of adaptability to differences of binocular light balance can be present in one eye in a patient with normal equal visual acuity in each eye; and (3) a marked loss of adaptability to binocular light differences is always present in an amblyopic eye.

**Fatigue of Accommodation**, H. H. Romaine, *The Eye, Ear, Nose & Throat Monthly*, March, 1951, Vol. XXX, No. 3, pp. 140-142.

The author sums up:

"We have suggested a practical approach to the treatment of debilitating fatigue of accommodation in the hope that it will be of service to practitioners and patients. The steps described indicate analysis of the defect, elimination of underlying factors, stimulation of accommodation and convergence, the use of spherical lenses and prisms as clip-ons to eliminate symptoms during the period of investigation, and to aid those who cannot be cured in obtaining some means of support available under their reduced ocular capabilities."

**Muscle Action Potentials as a Measure of Visual Performance Cost**, R. C. Travis, J. L. Kennedy, L. C. Mead, and W. Allphin, *Illuminating Engineering*, April, 1951, Vol. XLVI, No. 4, pp. 182-187.

The results of preliminary tests of the physiological cost of seeing have led the authors to suggest the following for further investigation: (1) continuation of the tests described; (2) reading 10-point type in a comfortable surround at low illumination levels for long periods of time; (3) reading at different illumination levels in a dark surround for long periods; and (4) analysis of industrial and commercial tasks in terms of tension level as affected by illumination.

## Book Reviews

RESEARCHES IN BINOCULAR VISION,  
Kenneth N. Ogle, Ph.D. Philadelphia and London: W. B. Saunders Company, 1950.

Doctor Walter B. Lancaster has written a foreword for this book which is so descriptive of certain principles in the subject matter that three paragraphs of the foreword follow herewith, verbatim:

"This book is an outstanding example of how an author should present his researches in a difficult subject.

"In the first place all the work of other investigators is given due weight. A frequent fault in presenting a subject like binocular vision is to leave out—even ignore—the work of others in the field. An author who does this usually does it because he is ignorant of what others have done, he has not sought out the sources of our knowledge in the field he is investigating, or he may do it from a motive of self-glorification. His own investigations may be a repetition of what has already been done. The fact that what he finds is new to him makes him think it is new to everybody, that no one has thought of that before. Some of these investigators are more interested in proving that they are the first to discover some truth than they are in establishing the validity of their findings.

"Dr. Ogle's role has been to subject these general ideas [of binoc-

ular vision] to scientific analysis, reject the false and place the true on unassailable foundations. Ogle has carried out this role not only through his original contributions to this field but also through the integrated account presented in this monograph."

Dr. Ogle has divided his book into four general subdivisions. Part I is "The Organization and Sensory Cooperation of the Two Retinas." In this portion, of five chapters, is presented and discussed, in very satisfactory detail, the structure of the visual pathways; corresponding retinal points and their significance; and an analysis and study of the empirical longitudinal horopter. This portion is a very necessary introduction to the later subject matter.

Part II presents "The Fusional Processes in Binocular Single Vision." This part considers the phenomena of fusion in its rather extensive ramifications.

Part III is a discussion of "The Problems in Binocular Vision when Changes are made in the Relative Magnifications of the Images of the Two Eyes." This portion consists of nine chapters given over to the subject matter just mentioned. It is essentially mathematical and can only be presented through mathematics. Because of that this portion of the presentation and Part IV, about to be discussed, will be difficult to assimilate. Part III covers the general concepts and defini-



tion of magnification, spatial localization, and those factors connected with stereoscopic perception of space, asymmetric convergence and the physiological principles of the induced effect.

Part IV concerns "The Experimental and Theoretical Bases for Aniseikonia." This portion of four chapters, and Appendix I and II, presents experimental, theoretical, and clinical application of image differences.

As the author stated in his preface, the greater part of the subject matter is based upon the researches in binocular vision carried out at the Dartmouth Eye Institute. This is a profound and exhaustive presentation of the subject matter as listed.

As Dr. Lancaster said, the book is a conspicuous example of a research worker more interested in proving exact truths than in proving that he (the author) is the one to whom credit should be given. This book is the authoritative source of the dependable basic truths so far discovered in the field of single binocular vision.

EDMUND B. SPAETH, M.D.  
*Philadelphia, Pa.*

BOOKS FOR TIRED EYES. The American Library Association. Chicago, Illinois.

The American Library Association, Chicago, Illinois, has just published the fourth edition of *Books for Tired Eyes*, a catalogue of invaluable assistance to those whose visual difficulties preclude the reading of books printed in type of ordinary size. It lists more than a thousand titles covering all important reading categories, from Art to World Horizons, and all the books listed are printed in type at least as large as 12-point. Many of

them are printed in 14- and 18-point type.

The catalogue itself is easy on the eyes, printed as it is on a soft, white, nongloss paper in a clear, uniform 12-point type.

M. A. C. Y.

VISUAL ENVIRONMENT FOR SCHOOLROOMS. Paul W. Seagers. *Bulletin of the School of Education, Indiana University*, Vol. 26, No. 3, May, 1950, p. 5-21.

This is an interesting and dynamic restatement of the fundamental principles involved in the production and maintenance of balanced visual environments in schoolrooms. It emphasizes the psychological aspects of the subject and introduces a clear, concise review of the important research on color and its effect on attitude and performance.

The 13 conclusions on page 19 constitute an excellent summary of basic facts relating to classroom illumination in the total sense and should be brought to the attention of all educators.

Throughout the monograph there is consistent agreement with the principles outlined in "American Standard Practice for School Lighting."

M. A. C. Y.

COLOURS AND HOW WE SEE THEM.

H. Hartridge, F.R.S. London: G. Bell and Sons, Ltd., 1949. 158 p. Ill.

Inspiration for the writing of this book stemmed from the author's participation in the Royal Institution Christmas Lectures in 1946. He felt that the subject especially lent itself to the entertainment and instruction of boys and girls. In his preface he



asks, "Which of all the things that we had pre-war are just as good as ever they were, with no lowering of standard and no restriction of output? At least one answer is: harmony and colour . . . the rich hues of spring and autumn, the glories of the setting sun, the spectrum of the rainbow. All these are just as perfect as ever they were"; and he proceeds to elaborate this thesis by presenting it in six chapters entitled: The Properties of the Spectrum; How Colours Are Produced; Colours and Their Uses; How Colours Are Seen; Some Illusions of Colour; Some Colours with Strange Properties. The volume is copiously illustrated both in colour and line drawings.

RECENT ADVANCES IN THE PHYSIOLOGY OF VISION. Hamilton Hartridge, F.R.S. Philadelphia: The Blakiston Company, 1950. 401 p. Ill.

This volume represents the author's summing up of the latest knowledge of the subject of vision and color perception. Dr. Hartridge has drawn from the writings of hundreds of leading experts in these fields, and discusses such topics as: Some Basic Properties of Vision; The Perception of Shape and Size; Investigations of Retinal Function; The Perception of Colour; Some Theories of Vision; The Neurology of Vision; Some Properties of the Structures of the Eye; The Appreciation of Light and Colour. The book is illustrated and extensively annotated.